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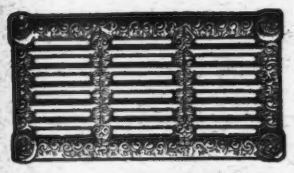

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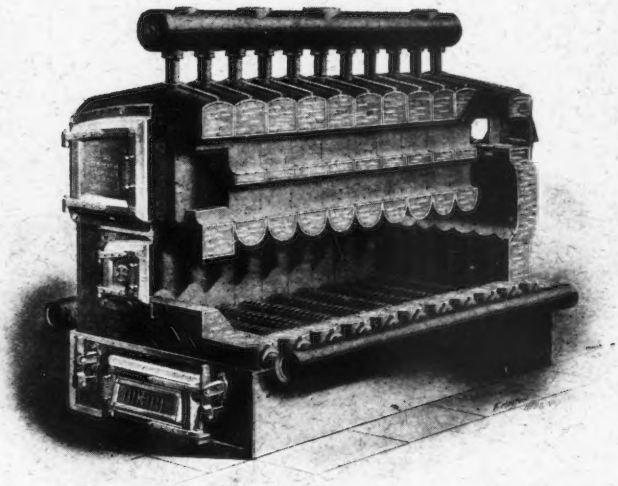

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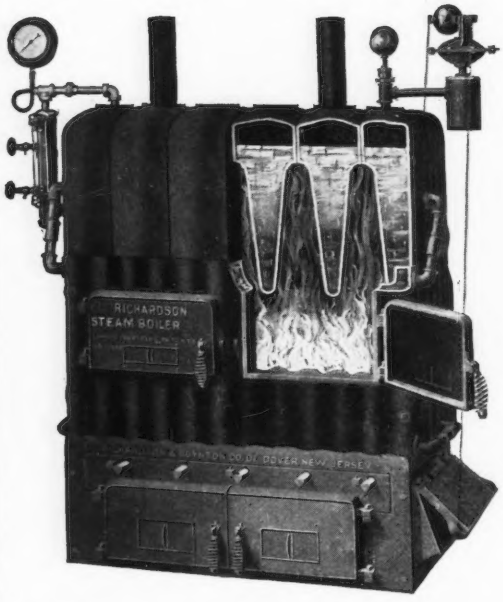

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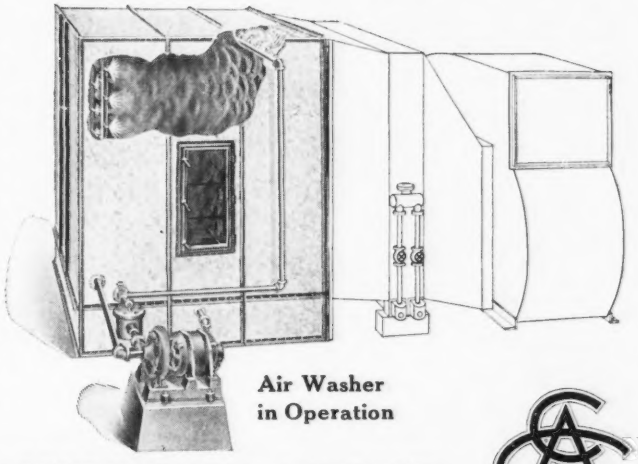

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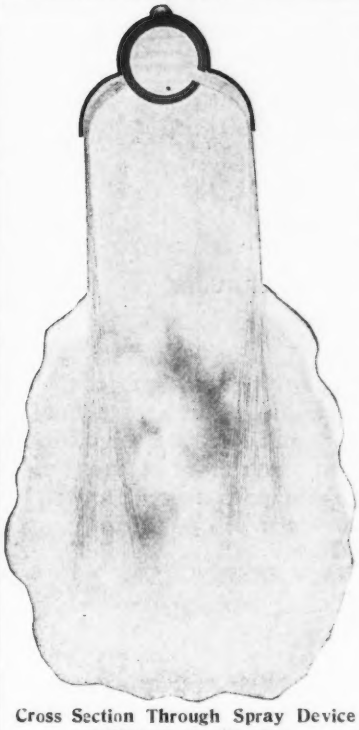

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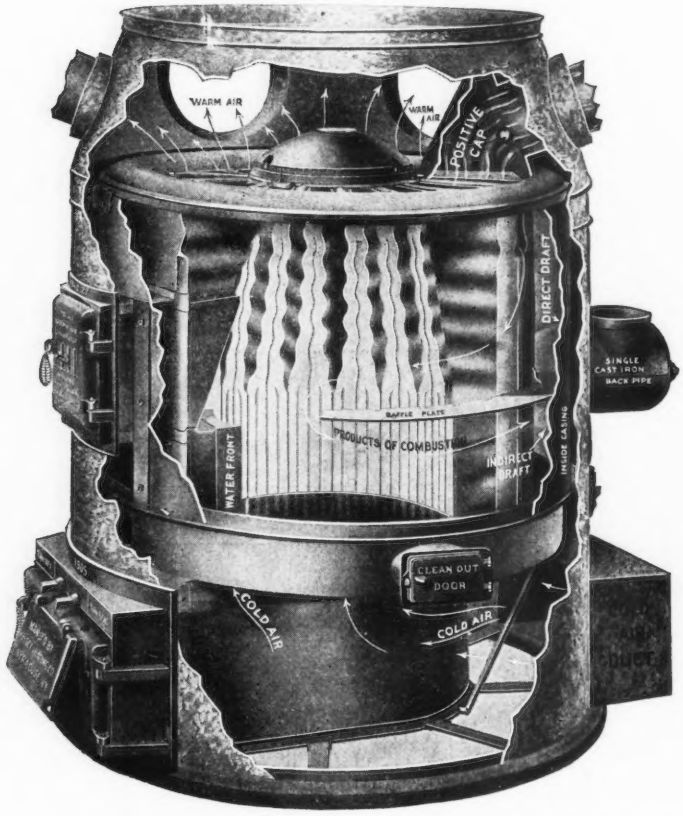

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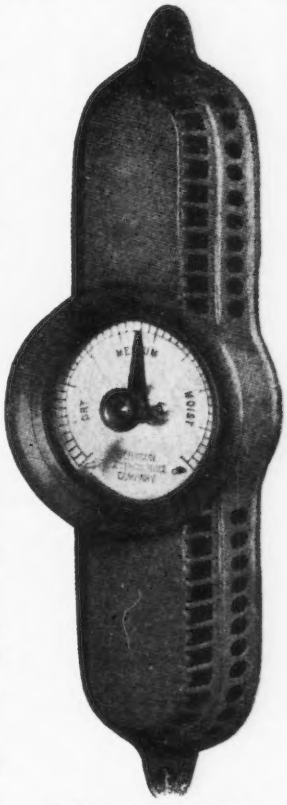

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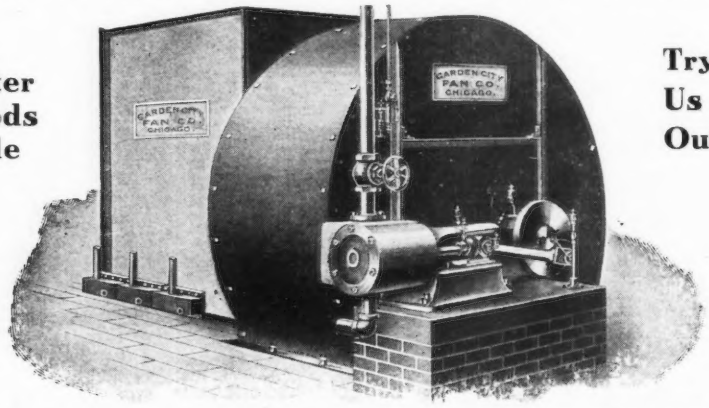

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The Heating and Ventilating Magazine

VOL. VI No. 2

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THE HEATING AND VENTILATING MAGAZINE

1123 BROADWAY NEW YORK FEBRUARY, 1909

Ventilation of Factory Buildings in New York State

Serious Conditions Disclosed by Investigation of State Department of Labor

Acting under the authority of the recently enacted factory ventilation law in New York State, a careful investigation of the air conditions in a large number of such buildings has been made during the past year, which confirm, to a remarkable degree, the statements of those responsible for the passage of the law.

The evidence is presented in detail in the 1908 report of the Commissioner of Labor, John Williams. After giving credit to Former Commissioner of Labor P. T. Sherman for the establishment of a system of medical inspection of factories, which was inaugurated two years ago, Mr. Williams says that during the year the medical inspector visited and tested the air in 136 workrooms, making 430 distinct tests. Tabulated results are given of 136 cases, the tables being divided according to industries. No attempt was made to work out averages, because the several readings in each establishment, showing vastly varying results, preclude any satisfactory conclusion from such a course.

80 PARTS OF CO_2 IN 10,000 REPORTED

Twenty-eight cigar factory workrooms were under investigation. Tests were made during a period when outdoor temperature ranged from 38° to 73°, and in many instances windows were partly opened, while in others all windows and doors were opened. It is worthy of note that in a few cases proprietors deliberately opened windows so as to render less pronounced the vile quality of the air in which their employees were permitted to work.

The highest number of parts CO_2 in 10,000 volumes recorded in a factory in this group was 80 on the third floor with windows partly opened and outdoor temperature of 49°, the test being made at the breathing level, or about 5 ft. above the floor. The lowest record was 8 parts in 10,000 volumes on the fourth floor of a factory, windows wide open, outdoor temperature of 71°; test made near open windows.

Generally speaking, the tests show that in cigar factories the air is ordinarily so impure as to make forced ventilation an absolute necessity. It is perfectly obvious that open windows do not furnish an adequate supply of fresh air; they serve only to mitigate somewhat the evil conditions indicated in our table. It would also seem that the area affected by the inlets (open windows) is somewhat restricted, for in some of the factories where tests were made with windows open, the air in the center of the room was found to be in a worse condition than in any other part thereof.

In our discussions with those against whom orders have been issued directing that means of ventilation be provided and that proper and adequate ventilation be maintained, we have insisted that even in summer, when all windows and other openings are available for the introduction of fresh air, such means will not adequately venti-

late their establishments. Our data sustain this view in every particular. If this be true regarding the question during the season mentioned, what must it be in winter when every window and door is tightly closed, when, as we are frequently told, the employees will not remain at work in a draft caused by the proximity of an open window, and when, therefore, windows and doors must be kept closed?

In the clothing industry 21 establishments engaged in the manufacture of men's and women's garments were inspected and tests made of the air therein. These tests were conducted under varying conditions. Outdoor temperature ranged from 40° to 73°, while windows and other openings were in some instances fully opened, in others slightly so, and in others closed. The lowest number of parts of CO_2 in 10,000 volumes of air recorded in this group of factories was 9, obtained in the front part of the establishment, close to an open window, while the highest was 42, obtained at breathing level over the pressers' table.

EFFECT OF GAS HEATERS AND GAS LIGHTS

The results of tests in this industry demonstrate clearly that the use of gas for illuminating and heating purposes is an important contributing factor in the creation of conditions inimical to the health of the operatives, for in each case where the record shows the test to have been made in close proximity to the gas-heated irons at the pressers' tables, or among the workers, where gas was burning for illuminating purposes, the quantity of CO_2 was much greater than in other parts of the premises.

This is also true regarding the coal stoves and other heaters which are used for commercial and heating purposes; they serve to vitiate the air, and no doubt they discharge into the workrooms noxious gases, adding to the sum total of impurities. Dr. Rogers calls attention to the danger present in establishments of this class arising from carbon monoxide. This added danger emphasizes the need of an abundant supply of fresh air, so that the element of danger may be reduced to a minimum.

Of the factories engaged in the manufacture of furs and fur goods, only two workrooms were examined. The tests, however, show that this industry must be given further attention. One case shows from 28 to 38 parts of CO_2 with all windows and doors opened, the higher figure being recorded at the pressing table where gas irons were used. A large number of concerns engaged in this line of business occupy old dwellings which have been converted into shops and factories. Consequently, the problem of ventilation in such establishments is surrounded with many difficulties.

Seven factories manufacturing men's hats and caps were inspected, and the tests of air were made therein under conditions favorable to the proprietors. Outdoor temperature ranged from 56° to 78°. In all but one case windows and doors were open when tests were made, and in one case a fan was running. But in spite of favorable circumstances the best that could be recorded in two cases close to open windows was 10 parts of CO_2, while the average ran close to 30 parts CO_2. The extensive use of gas for illuminating, heating and blocking, and the use of steam-heated hydraulic presses, steam jets, etc., coupled with the entire absence of adequate means of ventilation, combined to produce these results.

One factory manufacturing kid gloves was visited on a warm day—temperature outdoors, 72°. For some reason only 3 windows out of 9 were open when the air tests were made. The results obtained indicated an excessive amount of CO_2. But it would be unsafe to generalize in respect to the industry on the basis of tests made in one factory.

Laundry workrooms to the number of 19 were inspected and air tests made therein. These tests were conducted during the early summer, with outdoor temperature ranging from 65° to 79°. In each case recorded doors and windows were open and in some

instances exhaust or ventilating fans were running. This group, like the others, shows some remarkable variations in the quality of the air recorded, but there seems to be a comparatively even distribution of the disagreeable element over every section of the rooms involved, except that where gas is used the evil is aggravated. The variations in establishments engaged in the same business—employing identical methods—lead to the conclusion that the physical arrangement of the premises, or the utilization by some proprietors of such means as they possess to ventilate their establishments, or both, are the causes thereof. In one laundry the conditions apparently were almost ideal. Three tests were made, resulting in an average of a little less than 9 parts of CO_2 in 10,000 volumes of air. This, however, happened to be the washing room. The worst features in a laundry are found in the ironing room, especially if gas is used for heating the irons.

Another fact which seems to stand out in this group is that the degree of heat maintained in the workrooms does not seriously affect the quality of the atmosphere if fresh air be freely admitted. But where there is excessive heat together with vitiated air, the condition must be intolerable, and it is the imperative duty of the state to enforce the requirements of section 86 of the Labor Law.

For the reason that gas is extensively used to heat glue in factories where paper boxes are manufactured, it was deemed advisable to observe conditions in a few typical workrooms. This was done, and we have 3 cases recorded showing that this industry will need attention; for CO_2 ranging from 11 to 22 parts in 10,000 volumes was found while all doors and windows were open, the tests being made in warm weather, temperature outdoors 72° to 74°. If such a result was obtained under the most favorable circumstances, we are justified in the belief that when cold weather sets in, with the consequent closing of doors and windows, the air in such establishments will contain a much larger volume of CO_2.

CONDITIONS IN THE PRINTING AND PUBLISHING INDUSTRY

In the printing and publishing industry 55 workrooms were thoroughly inspected by Dr. Rogers, and 179 separate and distinct tests of the air therein were made. These tests were made under varying outdoor atmospheric conditions, the lowest temperature being 39° and the highest 82°. The workrooms were situated on different floors of premises occupied, from the subcellar to the ninth floor. The quantity of CO_2 found ranges from 7 to 40 parts in 10,000 volumes of air. In a majority of the cases recorded, natural or artificial ventilation, or both, had been resorted to, and were in effective operation at the time of the tests.

In a few only does it appear that no attempt was made to supply fresh air. Here again we find that the worst conditions exist in proximity to gas-using machinery or apparatus, while the air is purest at the open windows. A significant fact is brought out in the data covering this group. It is shown that where effective means of ventilation have been provided, and the same are constantly operated, satisfactory results are obtained, regardless of obvious natural difficulties, where linotype machines are situated in a cellar but exhaust fans have been installed which provide forced ventilation, with the result that the air in that workroom is as pure as in the corresponding department of a workroom on the ninth floor.

Then, again, it is evident that in some of the establishments recorded unscientific and therefore ineffective ventilating apparatus had been installed, for wherever CO_2 exceeds 12 parts in 10,000 it is presumptive proof that the quantity of pure fresh air admitted or forced into the space in question is inadequate. Three such cases were noted, where, in spite of the fact that ventilating fans were in operation, the parts of CO_2 in 10,000 volumes ranged from about 18 to 35.

Small wonder it is that the public has been told that the persons who are employed in our printing establishments are constantly menaced by ill-

ness and disease. The strange thing about the whole matter is that it was not taken up and agitated many years ago. Now that we know that one of the chief causes of ill health in this industrial group is the impure quality of the air in workrooms occupied by them, it is our duty to devote our energies to remedy the evil.

HEATING AND VENTILATING EXPERT NEEDED IN DEPARTMENT OF LABOR

In order to supplement the work of the medical inspector so as to properly handle the question of ventilation, the Labor Department needs the services of a competent engineer who should possess special and expert knowledge of the subject under discussion. Such person could examine and pass upon plans for ventilation proposed as a result of orders issued by the department, point out the defects in existing systems which are obviously ineffective, examine the installation of new systems in order to insure proper construction, and determine in disputed cases the volume of fresh air delivered in each workroom.

CONDITIONS AS SEEN BY THE MEDICAL INSPECTOR OF FACTORIES

Supplementing Commissioner Williams' report, the subject is presented from a medical standpoint by Dr. C. T. Graham-Rogers, state medical inspector of factories, who says:

My investigation and tests have proven that in factories where natural means of ventilation, *i. e.*, door, windows, transoms, shafts, ducts and skylights, or patent window ventilators, are relied upon, in cool weather they are ineffective and do not provide proper or sufficient means of ventilation, and also that in many places, where extensive ventilating plants have been installed, they have not been properly arranged to do the work for which they were intended; and also that the use of illuminating gas, both for light and for commercial purposes, does much to vitiate the atmosphere and to render ineffective the means of ventilation in use.

Natural means of ventilation in factories are ineffective, and compliance with a legal requirement establishing a minimum cubic air space per person is not a reliable guarantee of proper or sufficient ventilation. In many places where air tests were made the results showed a larger percentage of CO_2 where the room was large and the workers few than in others where the conditions were reversed, showing clearly that the department should be clothed with power to set a standard of permissible impurity and minimum amount of fresh air per person per hour to be supplied by artificial means.

Many manufacturing industries, owing to the use of alcohol, collodion, aniline, sulphur, or acids, and the danger of poisoning, especially to the many young workers engaged, particularly require artificial means of ventilation in order to properly mitigate such danger. Among these industries are: Incandescent mantles, artificial flowers and feathers, dry cleaning, rubber insulating, lacquering, lithographing, and coloring of post cards.

CAUSES OF MOST OF THE IMPURITIES

The more common impurities in the atmosphere of factories arise from the following sources: Emanations from the human body; artificial illumination; manufacturing processes; dust; escaping gases due to defective installation and defective plumbing, as well as odors and fumes entering the buildings from the street.

Body emanation, which tends to cling about the workers and render the air impure in their immediate vicinity, is mainly sulphuretted hydrogen, commonly known as crowd poison, and is most dangerous.

Illuminating gas is the chief means used in factories for artificial lighting. One ordinary gas jet throws off as much impurity as several persons. One authority states that as much CO_2 is produced by one gas jet as by three men, and as much heat as by five men. In some places there are several gas jets to each worker.

Where illuminating gas is used for purposes other than lighting, there is also danger of poisoning from carbon monoxide, which composes the larger part of illuminating gas, but is gen-

erated in large quantities in the gasoline motors used for power purposes. Hoods and piping should therefore be provided to carry off the products of combustion from all motors or apparatus using gas or gasoline.

Where illuminating gas is used for commercial purposes, or gasoline motors are installed, the danger of poisoning by the gas to which workers are subjected could undoubtedly be lessened if the department had authority to order that a notice be posted in all such places, warning of the dangerous nature of the gas, giving the symptoms of poisoning, and also certain suggestions as to the prevention and remedy; such notices to be in the language of the worker.

Bacteria in dust to be found upon dirty floors, escaping gas due to defects in plumbing and piping connections, and the gases and odors arising from unsanitary outdoor surroundings, are other main causes of impure air in factories. Even where artificial ventilation has been installed they do much to decrease its effectiveness. It is not necessary or practicable to make qualitative analyses of the impurities of air. The standard method agreed upon by sanitary authorities is to determine the purity of air by measuring the quantity of carbon dioxide present in ten thousand volumes of air sampled. The older authorities usually give nine parts of CO_2 in ten thousand volumes of air as a standard of purity, beyond which the air is noxious and unsanitary. As a result of the investigation conducted by the British Commission on Ventilation in 1902, Dr. John Scott Haldane set the limit of impurity as twelve parts of CO_2 in ten thousand volumes in the center of the room away from all workers in daylight; and where gas is used at night only, twenty parts of CO_2 in ten thousand volumes. Dr. Haldane recommends a working limit of ten parts CO_2 and a legal limit of twelve parts CO_2 in ten thousand volumes.

I am of the opinion that this standard is practicable and should be enforced in all factories except at unusual times and under unusual conditions that I am not yet prepared to define.

The determination of the volume of CO_2 is usually accomplished by means of the Pettenkofer tests, which require large bottles to take samples of air in the factory, a barometer for pressure reading, and a thermometer for temperature reading. The sample must then be taken to a laboratory and tested, and calculations made for pressure and temperature. This takes up considerable time, with the result that unless there be available a number of expert chemists and assistants, only a small number of tests can be made.

I have used a portable apparatus known as the Petterson and Palmquist apparatus for accurately determining CO_2 in atmospheric air. With this apparatus tests have been made and accurate results obtained without the necessity of calculations for pressure or temperature, so that within a few minutes after having obtained samples of the air, the test made on the spot was complete. I am now, however, at work devising an adaptation of this instrument which I hope will be so simple that it can be used and air tests made by the lay inspectors, which I hope will enable me to free myself more from this routine work, and thereby gain the time to devote to some of the other hitherto necessarily neglected subjects of sanitary inspections and investigations.

IMPORTANCE OF VENTILATION IN THE CLOTHING INDUSTRY

In the clothing or tailoring industry, ventilation is an important subject, owing to the large amount of illuminating gas used for commercial purposes, both for the patent pressing irons and the gas engines used for running air compressors. Many of these shops I found in old dwellings or tenements converted to factory use and in which no provisions were made for ventilation. They are really not adapted for factory use, and will continue to be a subject for remedial action unless more radical measures than at present are permitted and taken for their prevention.

Professor Glaisel has shown that constant working in close, illuminating gas atmosphere causes a condition of lethargy; hence the resort to stimulants, which is somewhat prevalent among tailors; and, as many of them are young workers, there is the tendency to intemperance and deterioration. In these circumstances this can only be overcome by providing for such workers plenty of pure, fresh air through proper and sufficient means of ventilation.

DANGER FROM DUST AND LEAD POISONING IN PRINTING SHOPS

The majority of the old-time printing shops were in fairly well lighted rooms, and the chief danger was from dust and lead poisoning. But with the advent of the typesetting machine the danger was increased, owing to the air being vitiated, not only by the irritating, poisonous fumes from the metal pot in the machine, but also from the illuminating gas used to heat it. This is true also of the larger metal pots used in electrotyping rooms, and many of the large newspaper offices visited were found to have photo-engraving departments off the composing rooms, and the irritating acid and ether fumes arising from this work contaminated the air throughout, especially where, as was often the case, ventilation was entirely neglected. Comparatively little effort had been made to remove the products of combustion and the irritating acid fumes in these offices, by means of hoods and pipes connecting the typesetting machines and metal pots with ducts or flues leading to the outer air; and in many places where this had been done the installation was ineffective, owing to neglect to conform to physical and mathematical laws. In some places exhaust fans were installed but were ineffective because of the bad draughts created; or where more than one was in use, the work of one interfered with the work of the other.

Some plants were located in cellars that were totally unfit, especially where typesetting machines were used. In one such place electric accumulators were being charged, which added to the danger of poisoning.

CIGAR MAKERS CROWDED IN STUFFY ROOMS

This is an industry in which the workers in many factories are crowded in stuffy rooms. They are subject to the irritation due to inhalation of tobacco dust, high temperature, high degree of humidity, and usually very little means for furnishing fresh air. These conditions, coupled with the fact that gas jets are usually lighted, serve to utterly vitiate the air.

The results of tests made in this industry showed an alarmingly high percentage of impurities in the air, in some instances more than 50 parts of CO_2 in 10,000 volumes being found; and in places, where windows were opened for a considerable length of time before tests were made, over 20 parts in 10,000 volumes. Many of the factories in this group are located in old buildings where the only means of heating is coal stoves. Therefore, ventilation therein becomes a complicated problem, for the fresh air introduced for ventilation must not only be heated but also rendered humid.

Hudson-Fulton Celebration, September 29 to October 9, 1909

The three hundredth anniversary of the discovery of the Hudson River by Henry Hudson in 1609, and the one hundredth anniversary of the successful application of steam to the navigation of the river by Robert Fulton in 1807, will be celebrated the latter part of this year. Preparations already under way indicate that the event will provide the occasion for one of the most elaborate and impressive celebrations this country has ever witnessed. The period during which the festivities will continue, extending from September 29 to October 9, will be filled with a variety of public demonstrations, including military parades and carnivals on both land and water.

According to the preliminary plans, September 25 and 26 will be religious service days; September 27, reception day; September 28, historical day; September 29, general commemoration day; September 30, military parade day; October 1, Hudson River day; October 2, carnival day; week beginning October 3, upper Hudson week.

Evolution in Heating

IV

By J. M. W. Kitchen

In the last number of this magazine I drew attention to a heating system which I consider has more advantages, in connection with health, comfort and economy in heating, than anything previously designed. I also, in that article, showed, in outline, a design for a very simple heater which I consider the most suitable form for medium-sized installations. But in connection with a system of this nature, which is also suitable for large installations, different types of boilers are more suitable—in case a greater service in heat generation is required, and I now show two types of that character.*

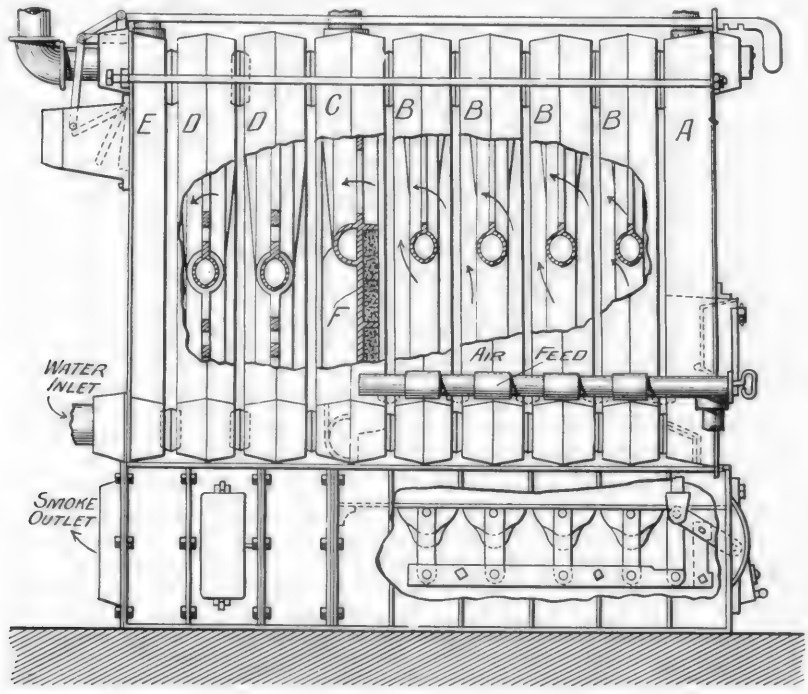


FIG. 11. THE TORRIDOOR "INCOMPARABLE" BOILER

A—Front section. B—Combustion chamber sections. C—Intermediate section. D—Economizer sections. E—Back section. F—Fire brick.

The first type is the Torridoor Incomparable boiler. This boiler was designed to at once meet certain commercial requirements in being able to sell a large service boiler at a relatively small price, and yet one in which the combustion of the fuel is substantially a perfect one, and in which the absorption of the heat generated is also relatively perfect. There are so many novel details in connection with this boiler that it would be tedious and confusing to relate them, so I will simply refer to several details which have been comprised in the apparatus with a view to securing its special efficiency.

In a boiler of large size and of a capacity that can be utilized in large buildings, greenhouses and other work, there is opportunity to apply certain structural features that cannot be applied in smaller devices. Remembering that about two-thirds of the air for combustion should be applied above

* The designs herein described are controlled by the Torridoor Power, Light & Heating Company of America.

The first article in this series was published in THE HEATING AND VENTILATING MAGAZINE for November, 1908.

the fuel mass in heating devices that are infrequently charged with fuel, and remembering that an apparatus of this size should have a grate surface of at least 30 in. in width, and of even longer antero-posterior diameter in some cases, it is obvious that a proper introduction of air from the front of the furnace cannot be secured with natural draft.

The experiences of various manufacturers have demonstrated that in some instances the damage of over fuel air feeding from the front of the furnace is so great that it is frequently better to make no provision for such air feeding, greater heating efficiency being acquired through the higher temperature of gases imperfectly burned than from gases perfectly burned with a consequent lower temperature diffused through a larger volume of the products of combustion. This has been specially the case in connection with boilers having inadequate amounts of heating surface.

The fact is that if one is going to secure the greatest economy in fuel, one must not only have a perfect combustion of all the gases, but also a sufficient amount of heating surface must be provided to pick up the heat which is diluted in the larger volume of gases; and, furthermore, these gases must be made to travel in counter-current to the travel of the feed water, in order that the low degrees of heat may be picked up by the cooler water.

This furnace has grate bars 30 in. in length, running transverse the boiler, each grate bar being uniform in width with the combustion chamber sections of the boiler. Intermediate between each combustion chamber section an air feed tuyere is introduced, of small diameter; the induction effect of the draft being sufficient to convey the divided small air blasts across the 15 inches of fire surface to the center of the grate bars. Provision in this air feeding is made for shutting off the air blast of each tuyere, so that there shall be no short-circuiting of air in undue amounts in any one place.

It should be borne in mind that too great an amount of air introduction at any one place lowers the critical ignition temperature of gases at that place, and throws partly out of commission some of the heating surface traversed by the unduly cooled gas.

Provision is made in this boiler for maintaining the heat in the fuel mass and burning gases until combustion is effected. These provisions comprise fire-brick around the fuel mass, inserted in special recesses in the boiler sections, and fitted in the face of the intermediate section of the boiler (see F in section C, Fig. 11); a restricted circulation of water around the combustion chamber; a high run for the gases before contact is made with the heating surface; and a minimum amount of heating surface at a low level in the combustion chamber, along with progressively increasing amounts at progressively higher levels.

There is nearly twice the heating surface exposed to the direct radiant heat of the fire in this boiler as there is in any previous design. There is comparatively little water in the boiler; and the highest heat is applied at the highest level, thus insuring very quick steaming qualities. Provision is made in this boiler for both vertical counter-current and horizontal counter-current travel of the gases and water. There is a combustion chamber separate from the economizer section chamber, into which latter chamber may be introduced as many sections as the buyer can be induced to pay for.

Incidentally, it may be stated that the purchase of each of the economizer sections (D) of the boiler would probably pay a yearly interest on its cost of from 25% to 50%, through saving low degrees of heat that are now lost. There is a high level gas exit and chimney draft accelerator; and a low level exit which would be normally used. There is always a large open route for the gases of combustion to travel through, and provision is made for check-drafting the fire by a separate chimney check draft, and by ability to completely close all the ash-pit openings.

Non-corrosive draft slides, and the handle at the front of the apparatus for manipulating the high gas exit

damper, are minor features, though of considerable importance.

The writer may possibly be pardoned for commenting favorably upon this child of his brain, because it represents many years of earnest struggle in overcoming difficulties in the pattern shop, the foundry and machine shop, in securing patterns for a commercially satisfactory appliance that comprises functional ability of a scientifically efficient character.

Fig. 12 represents a special type of boiler suited to the needs of certain installations where there is little head room, where the smoke outlet must be at the front of the boiler, and where frequent stoking attention can be given to the apparatus in its management. It is intended particularly to burn bituminous coking coal without smoke, and to secure a practically perfect combustion. The coal is fed frequently onto the front part of the grate surface, and, after being coked there, is pushed backward and distributed over the grate bars.

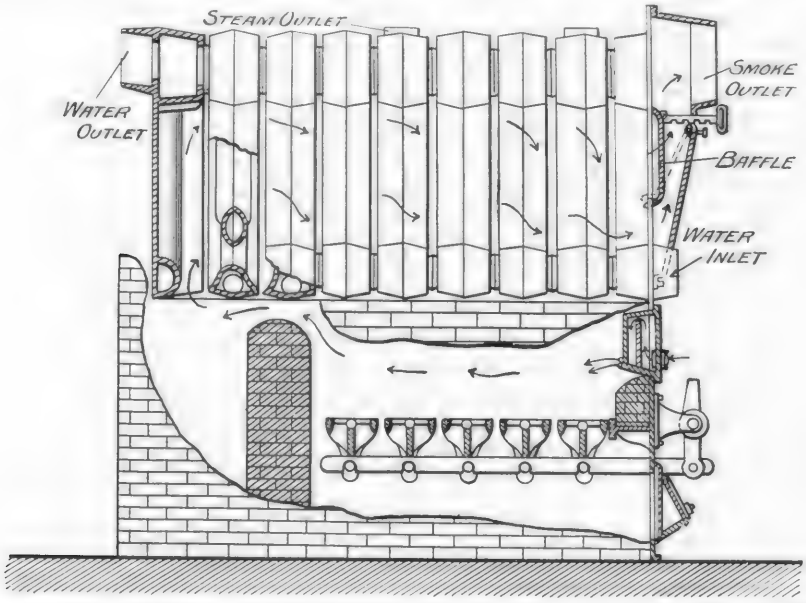


FIG. 12.—SPECIAL DESIGN OF TORRIDOOR BOILER FOR BURNING SOFT COKING FUEL

A sufficient supply of air is introduced along the front of the boiler over the fire, and the gas travel in the combustion chamber is from the front to the extreme rear of the boiler. No openings are provided in the bottom of the sections, except at the extreme rear, for the gases to rise into the sections. Hence, the partially cooled gases and air rising up against the bottom edges of the front sections of the boiler do not impart much heat to the water in those sections. This is specially designed so that the water in the front sections shall be cooler than those at the rear.

By the time the gases and air have reached the bridge wall a practically perfect combustion has been effected, and then the gases are allowed to rise to the crown sheet of the boiler, and are conveyed forward and downward and out through the opening at the front of the boiler.

In this case there is applied both the horizontal counter-current and the vertical counter-current travel of gases and water in the sections. The cool feed water enters at the bottom of the sections in the front, and emerges at the top at the rear, being progressively heated in the counter-current travel and the travel of the gases.

In the case of steam generation, emission for the steam is provided at several points in the highest line of the boiler. Provision is made for cleaning the sections from the front of the apparatus.

It is believed that this boiler gives the greatest amount of heating capacity for the least cost of construction of any previous design. It is perhaps not as entirely efficient in connection with a perfected combustion and heat transmission as the previous designs, and it involves a brick setting and frequent feeding of fuel and stoking attention.

(To be continued)

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

Fifteenth Annual Meeting, New York, January 19-21, 1909

[*Editor's Note—Additional detailed reports of the discussions will be published in* THE HEATING AND VENTILATING MAGAZINE *for March.*]

Confident in the strength of its added membership, and facing a future brilliant with promise, The American Society of Heating and Ventilating Engineers, at its fifteenth annual meeting, in New York, January 19-21 last, definitely passed into what might be termed a period of achievement. The accomplishments of the society in the past, notable as they have been, have, in a sense, blazed the way towards the new vista now opening before it.

The work of the immediate future will center around such projects as a reform in the rating of house heating boilers and a wider publicity through the lay press of the country as to the advantages, from a purely commercial as well as from a healthful point of view, of proper provisions for the heating and ventilation of buildings. One of the speakers, for instance, made the important point that owners of workshops and factories could be approached on this subject with practical data showing the increased efficiency of workers in healthful surroundings, insuring a saving in dollars and cents that would quickly offset the initial cost of the necessary equipment.

On the subject of boiler ratings, the society placed itself squarely on record with a definite, though tentative, plan which, it is understood, already has the endorsement of many of the largest boiler manufacturers.

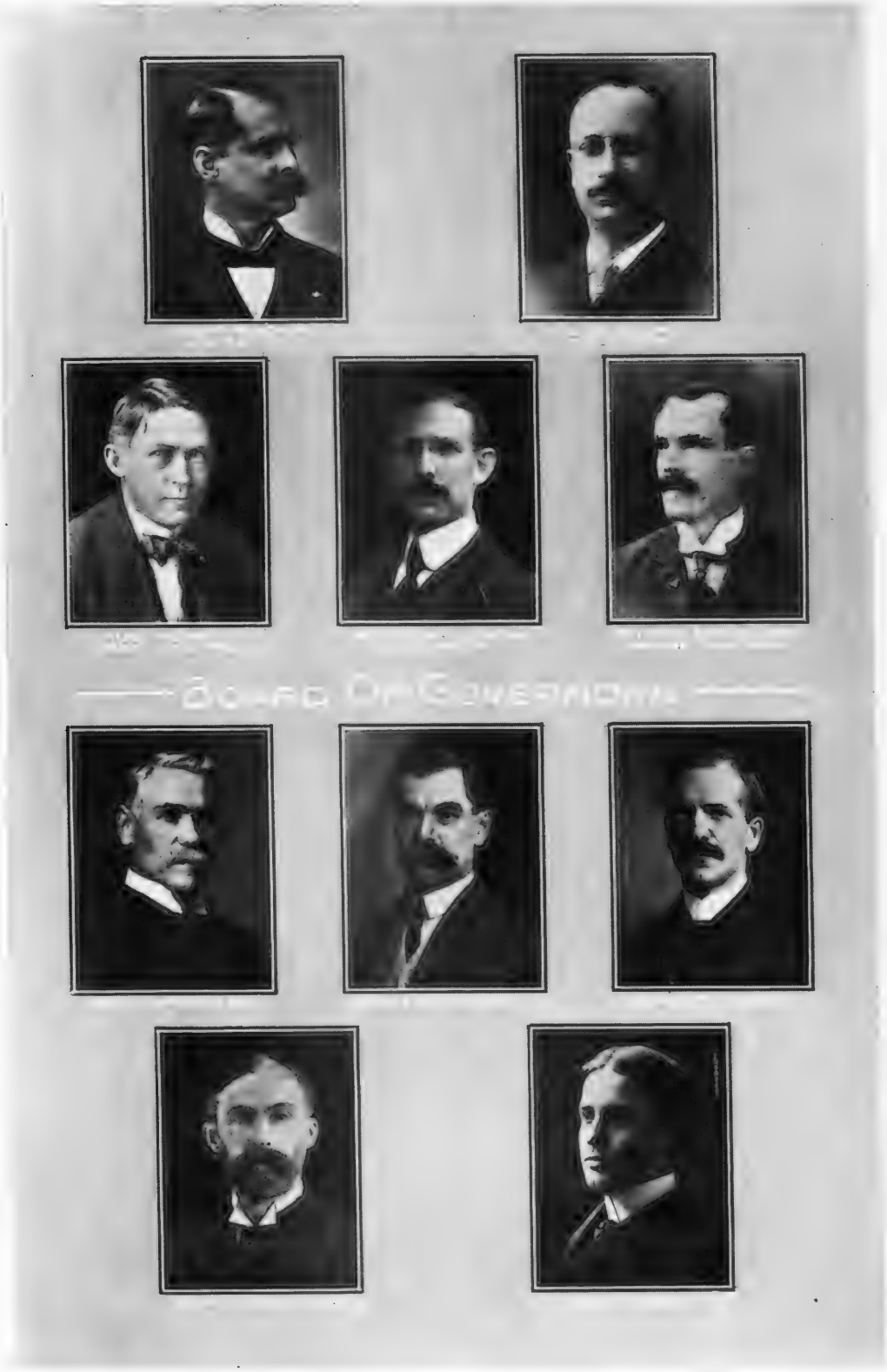
Another phase of the broadening of the society's work is to be found in the support that was given and will continue to be given to the enforcement of the ventilation laws now on the statute books and more especially the New York State law providing for the proper ventilation of factory buildings in that state.

The annual meeting was called to order Tuesday morning, January 19th, in the Engineering Societies Building, New York, with President James Mackay, of Chicago, in the chair.

The following members and guests attended the various sessions:

MEMBERS AND GUESTS

James Mackay, Chicago.
B. F. Stangland, New York.
W. M. Mackay, New York.
U. G. Scollay, New York.
Frank K. Chew, New York.
R. C. Carpenter, Ithaca, N. Y.
John F. Hale, Chicago.
August T. Kehm, Chicago.
C. B. J. Snyder, New York.
T. B. Cryer, Newark.
J. R. Shanklin, Charleston, W. Va.
F. G. McCann, New York.
J. C. Faulkner, New York.
M. D. Price, New York.
Burton P. Hall, New York.
E. M. Nichols, Philadelphia.
Andrew G. Paul, Boston.
H. W. Whitten, Detroit.
J. F. De Lorme, New York.
W. S. Moffett, Staunton, Va.
Ed. K. Munroe, Baltimore.
Herbert A. Joslin, New York.
H. D. Crane, Cincinnati.
Wm. E. Austin, Baltimore.
W. H. McKiever, New York.
A. S. Armagnac, New York.



NEWLY-ELECTED OFFICERS, AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

J. Barton Garfield, New York.
S. R. Lewis, Chicago.
John S. Brennan, Milwaukee.
Joseph Graham, New York.
Charles Morrison, Boston.
James A. Donnelly, New York.
George B. England, New York.
Burt C. Davis, Kansas City.
Wm. G. Snow, Boston.
C. G. Fundinger, New York.
H. A. Wilson, Boston.
O. L. Badger, New York.
Percival H. Seward, New York.
Thomas N. Thomson, Scranton.
A. G. Cripps, Akron, Ohio.
J. J. Blackmore, New York.
Robert Mayo, Jr., Washington.
Perry West, Newark, N. J.
Thomas Barwick, New York.
N. P. Andrus, Brooklyn.
Andrew Harvey, Detroit.
R. B. Hunt, New York.
Mark E. Monash, New York.
R. W. Pryor, Jr., New York.
Robert L. Gifford, Chicago.
Homer Addams, Philadelphia.
Davis S. Boyden, Boston.
A. C. Edgar, Philadelphia.
George W. Barr, Philadelphia.
W. H. Driscoll, Jersey City.
Henry B. Gombers, New York.
John T. Bradley, St. Louis.
C. Burchfield Kennedy, Pittsburg.
John P. Schaffer, Pittsburg.
Harry J. Marks, New York.
Lew. Moore, Portchester, N. Y.
C. M. Brodnax, Brookyn.
A. M. Feldman, New York.
A. W. Glessner, Chicago.
E. E. Spragge, Chicago.
Charles R. Bishop, Lockport, N. Y.
George W. Clark, New York.
Wm. D. Clark, Willimantic, Conn.
Conway Kiewitz, New York.
George D. Farnham, New York.
S. C. Parter, New York.
L. B. Sherman, New York.
Wm. Ritchie, New York.
C. W. Haensel, New York.
George V. Greey, New York.
F. H. Stevens, New York.
M. F. Thomas, Ithaca, N. Y.
J. M. W. Kitchen, East Orange, N. J.
M. E. Winans, New York.
E. F. Crawford, Oswego, N. Y.
Wm. G. R. Braemer, Camden, N. J.
Theodore Weinshank, Indianapolis.
W. A. Birdsall, Newark, N. J.
J. P. MacFarlan, New York.
C. W. Sisson, Boston.
E. H. Fisher, East Orange, N. J.
G. L. Greenman, New York.
G. H. Zellers, Washington, D. C.
W. W. Macon, New York.
C. Teran, New York.
Gustav A. Dornheim, New York.
George D. Hoffman, Chicago.
Horace C. Bushnell, New York.
E. S. Storm, New York.
H. M. Wylie, New York.
Richard Hankin, New York.
John Mosner, New York.
F. M. Commer, New York.
George W. Knight, Newark, N. J.
John F. Carney, New York.
G. E. Grimshaw, New York.
Warren Webster, Camden, N. J.
A. S. Webster, Camden, N. J.
Wm. C. Vrooman, Schenectady, N. Y.
F. A. Dwyer, Amsterdam, N. Y.
Daniel J. Rice, New York.
G. A. Harwood, Long Island City, N. Y.
E. W. Barnes, Chicago.
Thomas Wheatley, Syracuse, N. Y.
Charles W. Gullzers, New York.
M. P. Osburn, Camden, N. J.
John K. Berman, New York.
P. M. Richards, New York.
James E. Heg, New York.
E. C. Fisk, New York.
James E. Dobbs, New York.
Edward E. Sorg, Weehawken, N. J.
A. A. Cryer, New York.
A. E. Hall, Albany, N. Y.
Carl Lorentzen, New York.
J. Byers Holbrook, New York.
L. D. Bulette, Philadelphia.
Geo. O'Hanlon, New York.
T. M. Dick, Brooklyn.
A. J. Oneill, Brooklyn.
C. T. Catillaz, New York.
J. H. Kinealy, St. Louis.
Arthur Ritter, New York.
John Black, Trenton, N. J.
D. Stewart, Wilkes-Barre, Pa.
Robert A. Keasbey, New York.
James W. H. Myrick, Boston.
Louis D. Collins, Geneva, N. Y.
L. Thomas, New York.
Jno. K. Allen, Chicago.
Wm. R. Shannon, Chicago.
E. DeForest Winslow, Chicago.
C. P. McKnight, New York.
R. M. Ensign, New York.
Chas. A. Miller, New York.
D. D. Kimball, New York.
Daniel Stern, Chicago.
L. S. Thomason, New York.
Mark Dean, Philadelphia.
C. W. Old, New York.
W. G. Le Compte, New York.
C. H. Seymour, New York.
Robert A. Davies, Philadelphia.
C. E. Oldacre, Toronto, Canada.
Wm. W. Morgan, Jr., Philadelphia.
H. E. Kenney, Detroit.
Chas. E. Gorton, New York.
Adam G. Schwindt, Detroit.
J. F. McKean, New York.
A. E. Snowman, Philadelphia.
S. A. Beadle, New York.
Chas. S. Quay, New York.
J. Elmer Heg, New York.
S. E. Tuckman, Boston.

Following the roll call and the announcement of the election of new members, a list of which was published in our January issue, President James Mackay presented his annual address, which was in part, as follows:

President's Address

We are living in an age of specialization and progress; when ripe experience, practical knowledge and sound theory are paramount. The school house, the mail box and the telephone are crowding the frontier. The wolf and the wilderness are retreating. Are we keeping well abreast of this swinging forward march?

When we realize that in no line of human activity, save one, has greater material advancement been made during recent years than in the industries that are based chiefly upon the arts and sciences which we study and promote, this query is natural, and suggests vigilant consideration of all our affairs from every possible angle, so that we may wisely improve our methods and enhance the value of our labors.

The published volumes of our proceedings, 13 of which are issued, and one now due, mark our progress and indicate our growth. These volumes constitute our literature, and, in a broad sense, are our greatest asset, for they tell the world what we are, what we have accomplished, and what we hope to be. As a reference library, they are important, and are consulted as authority.

But a study of these volumes will show that certain subjects have been similarly discussed more than once, without eliciting in the later repetitions, anything of fresh engineering value. Therefore, it would seem wise, by some means, to thoroughly review our literature, so as to avoid these useless and time-consuming reiterations.

FUTURE MEETING TO REVIEW SOCIETY'S PROCEEDINGS

It behooves us also to keep our records up to a rigorous scientific standard. And, with these two points in view, it has been suggested that your society devote a future meeting to a review of our past publications. I concur in this suggestion, and recommend that your next president and board of governors arrange such a meeting.

Let us by the character of our attainments attract to our membership those of the profession whose association with us will be the most beneficial in promoting good.

Engineers, in the field of heating and ventilating, have, more especially, devoted their efforts towards inventing and designing improvements upon the older types of apparatus or appliances used in the better known applications of the art. Innovations have been made, but examples are comparatively few.

There are untrodden paths in the broad field of engineering effort which await exploration. We should know more about the use and possibilities of superheated steam. Simple and more efficient means are required for purifying the air and ventilating all the rooms of our buildings.

Another desirable possibility is a simple and inexpensive apparatus for cooling the air of our rooms during the summer months as many degrees F. as we now raise its temperature in the winter season.

But improvement in present practice is of equal importance. Let us discourage guess work and rule of thumb methods and encourage more scientific designing and installation of heating and ventilating work.

Our aim should be for excellence in theory and practice, bearing in mind as a precept the oft quoted words attributed to Emerson—"If a man can write a better book, preach a better sermon, or make a better mouse trap than his neighbors, though he build his house in the woods, the world will make a beaten path to his door."

Secretary William M. Mackay presented his report the principal portions of which were:

Secretary's Report

Your secretary would report an increase in membership during the past year. At the last annual meeting our membership was composed of a total of 323 members of all grades.

By a unanimous vote of the members present at the last annual meeting, Mr. Charles W. Newton, of Baltimore, Md., a former charter member of the society, was elected an honorary member. During the year we have added 32 members, 3 associates and 2 juniors to our roll, 3 members were dropped from the roll for non-payment of dues, 3 members and 2 associates resigned, 1 member, 2 associates and 1 junior failed to qualify, and we had 2 deaths in our ranks during the past year: Mr. Enoch Rutzler, who became a member in 1901, died Feb. 29, 1908, and Mr. Harry J. Ott, who became a junior member in 1906, died Sept. 25, 1908.

Our present membership is: 2 honorary members, 302 members, 26 associates and 17 juniors, a total of 347 members of all grades, a net increase of 24.

The financial affairs of the society are in a good condition. At the last annual meeting there was a balance in the hands of the treasurer of $2,044.86. During the past year we have received from all sources $3,928.93, which, with the balance on hand, makes a total of $5,973.79. The total expenditures amounted to $4,025.84, leaving a balance in the hands of the treasurer of $1,947.95.

There is owing to the society from members for dues and proceedings and from newly elected members for initiation fee and dues, $1,215. This, with the balance on hand, amounts to $3,162.95. All bills have been paid except those in

connection with this meeting, the secretary's account for December and the bill for the 1907 proceedings, which have just been received from the printer's and are ready to be sent out to the members.

The members dropped from the roll during the past year owed the society $80.

The 1908 proceedings are being edited and will be placed in the printer's hands as quickly as possible.

The secretary's expenses for the year amounted to $1,121.49, being $68.99 less than the previous year.

The society held a summer meeting at Niagara Falls, July 24 and 25, 1908, which was successful in every way.

The secretary has 15 applications for membership, which were received too late to be included in the last ballot. This will insure a ballot being sent out as soon after this meeting as possible, and those having applications to send in should do so at once, so that they may be placed on this ballot.

Treasurer U. G. Scollay, in a detailed report, showed receipts for the year to be $5,973.79 and expenditures $4,025.84, leaving a balance on hand of $1,947.95.

The report of the Board of Governors, practically in full, was as follows:

Report of the Board of Governors

The society has acquired membership in the National Fire Protection Association, receiving their publications, and has applied for recognition on their committees, and also suggested the forming of a new committee on "Necessary Fire Protection in Connection With the Installation and Operation of Heating and Ventilating Apparatus."

On request, the question of members using the emblem of the society on their stationery was considered, and it was decided that it should not be used except on the society's stationery, but that the different grades of membership were privileged to use the words: "Member, associate member, or junior member, The American Society of Heating and Ventilating Engineers," on their stationery should they desire to do so.

It has been brought to the attention of the board that members and others have published papers, extracts from papers and discussion of topics as having been presented before the society without obtaining its consent. This is in direct violation of the condition under which the papers are accepted.

We now have a flagrant case of disregard for the society's established rules in this respect where an advertising agent has violated our rules.

The board has called attention to the violation and has requested that the circulation of the pamphlet referred to above be stopped, and would recommend that such steps be taken as may be necessary to protect the society's interest in the matter.

The society has been criticised in the past regarding the care exercised by its officers over the acceptance and printing of the papers and their publication in our proceedings, but the vigilance which would have positively protected the society has been impossible, owing to the short time that could be taken for this important work.

We feel that, regardless of the action of other societies in this matter, which at times has been quoted, too much care cannot be exercised if we wish to maintain the high standard which has always been aimed at, and in connection with this matter we feel justified in quoting from the December, 1908, issue of the Journal of the American Society of Mechanical Engineers:

EXTRACT FROM THE REPORT OF THE PUBLICATION COMMITTEE, AMERICAN SOCIETY OF MECHANICAL ENGINEERS

"The committee has examined carefully all of the papers presented at the meetings of the society, with a view of passing upon their suitability for publication in the Transactions. In this work it has endeavored to maintain the dignity of the Transactions, and to this end has considered it its duty to omit any objectionable personalities that might be found in the papers or in the discussions of the same. It has also endeavored to omit portions of papers or discussions where this could be done without eliminating ideas or data.

Proceeding in accordance with the above plan, the committee has found it advisable to omit the publication of several papers, and in other cases has eliminated a considerable amount of matter from the text."

EXTRACT FROM THE REPORT OF THE MEETING COMMITTEE, AMERICAN SOCIETY OF MECHANICAL ENGINEERS

"As a natural result of the expansion of the society's work, the number of papers submitted to your committee for approval has very greatly increased, so that it becomes necessary to reject a considerable proportion of those which are offered. We believe this condition is one on which the society is to be congratulated. The aim should be to make our publications of such rank that it will be esteemed an honor by an engineer to have a paper accepted and published by our society. This condition can only be brought about, however, if the number of papers offered continues materially in excess of the number which will be used, since it is only when such a surplus exists that proper selection becomes possible.

"The objection will doubtless be raised that it is a disappointment to an individual author if after spending much time in the preparation of a paper it is finally rejected by the society. The answer to this objection is that the interests of the profession—of the society as a whole—are more important than the interests of any individual. If our society finds itself obliged to reject an offered paper, its author is at liberty to seek publication through other channels.

"There are, however, certain papers which by reason of great length, or because they appeal only to some small branch of the profession, would not be accepted by any journal published by private enterprise, and are for the same reasons undesirable for our society publications. We believe that certain papers of this class, where they contain material which would in some form, be made available for record, can be treated in the way which has long been practiced by the Institution of Civil Engineers of Great Britain. That is, the paper as a whole can be filed in the society's library for reference, and either its title only or some brief summary of the writer's conclusions and recommendations can be published in the society's Journal.

"By proper adoption of such a policy, it should be possible for the society to increase the number and variety of papers in its Transations without increasing the bulk and expense of the volume."

EXTRACT FROM THE PROCEEDINGS OF THE ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA, INC. 1880

"All papers, on their acceptance by the publication committee, become the property of the society, and it lies within the discretion of the committee to publish them in whole or in part."

The financial affairs of the society are in a prosperous condition, and the membership is larger and more representative than ever before, with every indication of a large increase during the coming year.

JAS. MACKAY, Chairman,
J. D. HOFFMAN, Vice-Chairman,
B. F. STANGLAND,
FRANK K. CHEW,
R. C. CARPENTER,
AUG. KEHM,
C. B. J. SNYDER,
JOHN F. HALE,
W. M. MACKAY, Secretary.

Following the report of the Board of Governors, J. J. Blackmore, chairman of the committee to collect data on steam heating of small buildings, presented the following results of the work of his committee, the other members of which are James A. Donnelly and George B. England:

Data on Steam Heating for Small Buildings

The committee decided to divide the work of collection of data into divisions, as follows:

THE BOILER

from the manufacturer's viewpoint and from the viewpoint of the engineer who purchased it for installation, the figuring of radiation for loss of heat, and the practice for installation of flow and return pipes.

Inquiry among the manufacturers shows that a good deal of progress has been made toward standardizing, but that a good deal yet remains to be done. The size of grate for a given size boiler, or the proportion of grate surface to the capacity of the boiler, varies so much that inquiry was made on this point, and no satisfaction could be obtained, but a comparison of six of the leading sectional types is here made to show the proportion in this respect.

GRATE SURFACE AND RATINGS IN SIX HEATING BOILERS

Boiler.	A.	B.	C.	D.	E.	F.
Rated capacity	800	800	775	750	750	750
Square inches of grate.	616	740	648	528	630	648
Ratio of grate to 100 ft. of capacity	77	92.5	83.6	70.4	84	86.2

The question of how much coal should or could be burned per square foot of grate does not appear to have been considered by many of the makers, and your committee could only learn of three manufacturers who had done anything to determine how much coal should be burned per square foot of grate in small boilers.

If we take a boiler of 800 sq. ft. of steam radiator capacity, it will have to transmit 216,000 B. T. U., assuming that each square foot of radiation gives off 270 B. T. U. per square foot per hour. If we assume that 10,000 B. T. U. is the thermal value of a pound of anthracite coal that can be usefully transmitted in a house heating

plant, we must burn 21.6 lbs. of coal per hour when the heater is running at its maximum capacity, and for a boiler of 750 ft. we would burn 20.25 lbs. of coal. This gives a rate of combustion of 5.1 lbs. per square foot for boiler A, 4.2 lbs. for B, 4.65 lbs. for C, 5.63 lbs. for D, 4.4 lbs. for E, and 4.5 lbs. for F. This variation is so great that it would seem that the manufacturers have not yet adopted a standard.

BOILER HEATING SURFACE

The question of heating surface in a boiler seems to be an unknown quantity, and inquiry among the manufacturers does not produce much information on the subject. Some of the makers have experimented to determine the amount of heat transmitted per square foot of boiler surface, but your committee could not ascertain that any data were gathered as a result of such tests. Your committee did see some calculated data on this subject, but could not ascertain that any one used it or was guided by it. The proportion of fire surface to flue surface has had some attention from the manufacturers, but no definite proportion is stated, except by one maker, who claims 60% of fire surface and 40% of flue surface.

Very few manufacturers give the amount of heating surface in small boilers, nor do they give any rule by which their boilers can be measured. For the purpose of getting information from the various engineers who make a business of installing small heating plants, a series of questions was sent to members of the society and others. The committee did not depend entirely on these question blanks, but inquired personally, in different parts of the country, with a view to gathering information.

To the question, "Do you depend on manufacturers' ratings?" 80% of the replies are "Yes," 7% reply "No," and 4% "Not without checking."

To the question, "What percentage do you add to the radiation to provide for loss by boiler and piping?" 70% of the replies say, "25% should be added"; 10% reply, "30% should be added"; 10% say, "18% should be added," and 10% reply that they figure the actual amount of the loss, and so add it to the radiation.

To the question, "What additional do you figure as a factor of safety?" 70% reply, "25%"; 10% reply, "30%"; 10% reply, "15%," and 10% reply "10%."

To the question, "Do you consider grate surface a factor in sizing up the boiler?" 80% reply "Yes," and 20% "No."

To the question, "How many inches of grate do you figure to 100 sq. ft. of surface?" very little could be learned, and nearly all replies to the questions left this blank.

To the question, "Do you consider the shape a factor?" 82% reply "Yes," and 18% "No." Some preferred round fire-pots, and some square or oblong, but not enough information could be gathered to put these into exact percentages.

To the question, "Do you examine the chimney of a building to determine the draft you will get?" 90% reply "Yes," and 10% reply "No." Inquiry on this point shows that examination is made only as to its size, and to see that it is properly built, and that no other stove or heater goes into the same flue. The committee could not learn that any attempt was made to test chimney flues for velocity by any one engaged in the work of erecting small steam plants.

To the question, "Do you figure on any rate of combustion per square foot of grate per hour?" 86 per cent. reply "No," 14% give rates of combustion of 5 lbs., 7 lbs. and 8 lbs. per square foot of grate per hour. The committee does not consider the high rates of 7 or 8 lbs. should be taken as reliable in such small plants.

To the question, "What steam pressure do you figure on as a basis?" 60% reply "2 lbs.," 20% reply "3 lbs.," 10% reply "5 lbs.," 10% reply "1 lb."

QUESTIONS ON FIGURING RADIATION

In answering these questions most of the replies state that they use some standard rule, and the following are mentioned quite freely: Baldwin,

Mills, Carpenter, Snow and Wolff. The committee received very few replies that indicated the cubical contents only of a building were figured on. The replies indicated that all northern rooms were provided with 10% or 15% extra radiation.

Answers in regard to indirect radiation: 86% added 50% to 60% to the direct radiation which would be needed for the same room; 14% of the replies figured on the exact amount needed to provide for the air changes. No answers were received nor information obtained that could be tabulated in regard to the best type of radiator to be used. The trade seemed to give them all about the same value.

FLOW AND RETURN PIPES

In the answers received on this subject none of the questions was replied to, but a large number of replies were received to the question: "How large a main pipe should be used for 1,000 ft. of radiation?" None were less than 3 in., some were 3½ in., and a few 4 in., showing uniform practice within a reasonable range.

Your committee found that nearly all work of installing small steam heating plants was done under what is classed as competition work; and the engineering features of such installations have been reduced to what might be called rule of thumb practice, guided by experience.

The fact that a very large number of plants are installed each year and give excellent results would indicate that the art has made good progress.

The committee did not consider it part of their work to take data from standard works that can be referred to at any time, but rather to secure all possible information from parties engaged in the business.

The following report was submitted for the Illinois Chapter, and was read by John F. Hale:

Report of Illinois Chapter

The Illinois Chapter of this society wishes to report that it is still holding its regular monthly meetings from October to May, inclusive, and each meeting has been so well attended that we are assured of a continuance of our prosperity and interest in the society's affairs. We have a present membership in the chapter of 30, out of a total of 53 in the State.

At our November meeting we listened to a very interesting talk by Mr. Mehring, describing the heating and ventilating apparatus in the gymnasium at the University of Chicago, and this was followed by a general discussion of methods employed to ventilate buildings of this type, and particularly the locker rooms. This talk was illustrated with the working drawings, and brought out the usual difficulties met in connection with apparatus of this kind and showed how they were overcome.

At our December meeting Mr. Hale exhibited drawings from which the ventilating apparatus was erected in the new Majestic Theater Building at Milwaukee, in which the entire space beneath the parquet is used as a plenum chamber from which heated air is admitted into the auditorium through 6-in. tubes, set into the concrete floor beneath the seats. Various members expressed themselves for and against the methods employed. The fact that the system was a success proved, however, that one does not have to follow any hard and fast lines to get results, but must modify his layout to suit local conditions. The one prominent fact brought out was the lack of space provided by architects for the proper installation of apparatus, and it was shown that the contractors frequently find it impossible to install a system in accordance with ventilating laws owing to the lack of space provided for the admission of ducts.

Mr. Capron exhibited a set of plans showing a hot water apparatus which he was called upon to change over owing to the lack of circulation in certain parts. He first showed the plant as it was and asked for suggestions as to the best method of overcoming the difficulties, and afterward told what changes he had made in order to get results. This was a most interesting discussion, as it brought out many different theories and ideas on the subject.

Our January meeting was held on the 11th inst., at which time we listened to a report from our local committee on tests which report will be forwarded to the national committee. This report related exclusively to the testing of cast iron rediation of various heights and widths, and brought out some interesting facts regarding the efficiency of radiation when bronzed as compared with enamel as a finish, this being much in favor of the latter in every case. The effect of placing a seat above a low radiator was dwelt upon, showing a rapidly decreasing efficiency as the seat was brought closer to the top of the radiator, the nearest

point permissible without ill effects being 3 in.

Samuel R. Lewis described the heating and ventilating apparatus installed after his design in a large school building where he used a fan with tempering coils near the center of the building, distributing temperate air to groups of indirects so located as to give an equal distribution to all points of the building. An important feature called to our attention was the possibility of opening the by-pass around the reducing valve and a corresponding valve in the return, thus admitting steam direct to the system and allowing a gravity circulation to prevail even after the fan had stopped and the steam had dropped to a very low pressure. The especial advantage of this method over the combination system using direct and blast was the possibility of maintaining temperatures over night without giving the system any particular attention.

COMPULSORY VENTILATION IN ILLINOIS

Our local committee on compulsory legislation for the ventilation of public buildings is preparing to present the bill to the present legislature. This bill was printed and ready for the first reading at the last legislature two years ago, but was not reached during the session. We are assured by our committee that they have matters well in hand and there is no question that the bill will go before the house, and we are hopeful of having it passed. This bill is similar to the ones passed in the States of Massachusetts, New York and Pennsylvania.

No other committees being ready to report at this session, the chairman proceeded with the appointment of tellers to count the ballots for officers, naming John R. Shanklin, O. L. Badger and F. G. McCann.

Under the head of new business, it was voted to send letters of condolence to the families of the late Enoch Rutzler and the late Harry J. Ott, both of whom were members of the society and died during the past year. It was also voted to send a similar letter to the family of the late Alfred R. Wolff, whose death was chronicled in our last issue. Mr. Wolff, though not a member of the society, had done much to promote its interests, as well as the interests of the profession of heating and ventilation generally.

Tuesday Evening, January 19

At the opening of the evening session the result of the ballot was announced as follows by John R. Shanklin:

NEW OFFICERS

President, William G. Snow, Boston.

First vice-president, August Kehm, Chicago.

Second vice-president, Burt S. Harrison, New York.

Secretary, William M. Mackay, New York.

Treasurer, U. G. Scollay, Brooklyn.

Board of Governors: R. C. Carpenter, Ithaca, N. Y.; James Mackay, Chicago; John R. Allen, Ann Arbor, Mich.; B. F. Stangland, New York; Samuel R. Lewis, Chicago.

NEXT ANNUAL MEETING TO BE A REVIEW MEETING

At this point a suggestion was taken up to review the published proceedings of the society since its organization, and on motion of Frank K. Chew it was voted to make the next annual meeting of the society a review meeting. A committee was appointed, with William G. Snow as chairman, to discuss ways and means and report at one of the later sessions.

The Review Meeting committee reported at the Wednesday afternoon session, stating that it had planned to divide the review work under a number of heads, a member to be assigned to each division. In this way it is hoped to index and possibly revise the published proceedings of the society, so that the various subjects may be rendered more accessible and the duplication of matter on the same subject eliminated. The following appointments were made:

Furnace Heating, Clarence M. Lyman.

Hot Water Heating, W. M. Mackay.

Steam Heating Large Buildings, John F. Hale.

Steam Heating Small Buildings and Residences, Samuel R. Lewis.

Electrical Heating, Thomas N. Thomson.

Heating Boilers, P. H. Seward.

Radiators and Heaters, W. W. Macon.

Central Station Heating, John R. Allen.

ANNUAL DINNER OF THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, AT THE NEW GRAND HOTEL, NEW YORK, JANUARY 20, 1909

Ventilation, Thomas Barwick.
Compulsory Legislation, S. A. Jellett.
Tests, J. D. Hoffman.
Standards, R. C. Carpenter.
Fans and Fan Heating, Burt S. Harrison.

The meeting then took up the report of the Committee on Tests. In the absence of the chairman, Prof. J. D. Hoffman, this report was read by Theodore Weinshank, one of the members of the committee, and ordered printed. (This report will be published in THE HEATING AND VENTILATING MAGAZINE for March.)

The report of the Committee to Collect Data on Fan Blast Heating was read by the chairman, William G. Snow. This consisted of a reprint of an article on the subject, published in October, 1907, and concluded with an extract of a paper read by Theodore Weinshank at the last semi-annual meeting on "Cast Iron Heaters for Hot Blast Work" (published in THE HEATING AND VENTILATING MAGAZINE for July, 1908).

The final report of the Committee to Collect Data on Hot Water Heating for Residences, E. F. Capron, chairman, was read by Samuel R. Lewis. In addition to the matter contained in the preliminary reports of this committee (published in THE HEATING AND VENTILATING MAGAZINE for March, 1907, and February, 1908), the report was as follows:

Water Heaters

The use of steam coils in a tank or feed-water heater for heating water to supply hot water radiation is common, and because of the rapid circulation and ease of regulation gained is often desirable.

Having determined the amount of hot water radiation, to find the square feet of brass piping in a tank necessary to heat the water to the desired temperature:

$R \times X \div (S - W)\ 95 =$ sq. ft. brass pipe surface.

R = hot water radiation; X = B. T. U. given off per hour by 1 sq. ft. of radiation (150 for direct, and 230 for indirect at 170°); S = temperature of the steam (depending on pressure used); W = temperature of the water. 95 is the approximate B. T. U. given off by 1 sq. ft. of brass coil per degree difference per hour. Allowance must be made liberally for mains and tank radiating surface.

The following hints from an engineer of wide experience may be of aid:

FEED MAINS

When the radiators are all on the same level, those branches within 10 to 15 ft. of boiler are taken off the side of the main. When, however, there are any second or third-floor radiators, with branches within 10 or 15 ft. of boiler, these branches are taken off the side of the main, and all first-floor branches are taken off at 45° angle.

RETURN MAINS

All return branches run into side of main regardless of their length. All returns within 10 or 15 ft. of boiler run separately to bottom of boiler instead of joining main return, so as not unduly to heat the drop in the return main.

Pitched fittings should be used instead of crooked threads at all connections between horizontal and vertical pipes.

Another states that he has been using with perfect satisfaction special radiator tappings side by side at the bottom of one end of each radiator. This results in economy of installation and a neater appearance of the job.

Rating of House Heating Boilers

A paper by Prof. William Kent on "The Rating of House Heating Boilers" was then read (published in our January, 1909, issue). This paper was the opening note of an extended discussion of the subject which was carried over to the next day. The discussion was continued by Percival H. Seward, who contributed a thoughtful paper, embodying ideas that received, at a later session, the tentative endorsement of the society. Mr. Seward's paper is presented in full herewith.

A Standard Rating for Steam and Hot Water Heating Boilers*

A Rational Basis That Is Likely to Receive the Endorsement of the American Society of Heating and Ventilating Engineers

By Percival H. Seward

The records of this society contain more references to the question of ratings for heating boilers than to any other single problem, and a perusal of same, as well as the articles and discussion in trade papers, indicate a general desire for some method which will make a standard rating possible and convenient for all parties interested.

Three committees have been appointed by this society whose duties embrace the subject of heating-boiler ratings, but no conclusions have been reached because attention has been diverted from uniform rating to uniform construction.

It is clearly not within the scope of the society to set a standard for uniform construction, and efforts along that line will always result in failure and discredit. A uniform construction would not be desirable, and no standard can ever be adopted which even suggests construction without leading to freak boilers and complete paralysis of effort for future improvements.

At the last annual meeting of the society the committee appointed to secure data on hot-water heating submitted their report with the following statement in regard to boilers:

"Many boilers for residence heating are not rated satisfactorily in the catalogues. Among twelve familiar types the hot-water rating for the same grate surface varies from 2,800 to 3,875 sq. ft. The amount of fire surface is not generally published, and information is difficult to obtain. It probably varies 50% among these same twelve types."

The discussion which followed the reading of this report was with reference to the value of heating surface and the quantity of same that should be used in a boiler, instead of the method for obtaining uniform ratings, which are desired.

Boilers can never be rated on quantity and quality of surface

A belief is becoming general that the rating of all heating boilers can never be made uniform by any calculations based on quantity and quality of their surfaces because of the very numerous forms in which these surfaces can be cast and placed.

The only consideration is efficiency as determined by test of each individual boiler or design, and it is the opinion of many engineers that this society should set a standard for such test, with a formula for determining the power or rated capacity of the boiler.

While it is possible that experiments and tests, the results of which are at this time available, may give some data from which conclusions can be drawn as to the value of heating surfaces in certain types of cast-iron boilers, investigations along purely commercial lines lead to the conclusion that the makers of such boilers determine the value of the heating surface by a test of the boiler as a whole, and make no attempt to determine the ratio of work done in the fire-box or flues.

There is a general desire for knowledge on this matter of distributing work done, but the experiments necessary are expensive and complicated, and, so far as can be learned, nothing has been attempted, except in a very crude way, with some makes of boilers which readily admit a separation and division of parts to follow the two generally accepted types of heating surface—direct and flue.

A study of many patterns of cast-iron heating boilers indicates the almost impossible task of attempting to determine by any general and easily applied rule or formula the evaporative power of their heating surfaces. There is a widespread and growing convic-

*Paper read at a conference of heating engineers, master steam and hot-water fitters and boiler and radiator manufacturers during the annual meeting of The American Society of Heating and Ventilating Engineers in New York, January 19-21, 1909.

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tion among manufacturers of these boilers to the effect that each individual construction must be tested to determine its heating power as expressed by evaporation of water.

The reason for this is evident when it is noted that, with very few exceptions, a cast-iron heating boiler changes its proportions with every size; therefore, to test one size and measure the others will lead to some almost ludicrous conclusions as to capacity.

VARYING LENGTH OF FLUE TRAVEL A FACTOR

The varying length of flue travel is one of the features that might be called to mind in explaining the difficulty referred to, especially when we take into consideration the theoretical value of surface as calculated by difference in temperature between the gases and the water. Furthermore, calculations which can be made by temperatures somewhat easily obtained are subject to very great modification by the rapidity with which the gases travel, the angle at which they impinge, and the movement of water on the inside of the surface.

These considerations vary with each type of boiler and, in many cases, with each size of given type, and they are furthermore complicated by changes in the facility for cleaning, which sometimes reach the extremes of making that operation almost impossible on certain sizes.

Another varying factor, even though tests were commercially possible to determine the value of surface, would be the efficiency to be obtained from fuel, and that in turn to affect the rapidity with which coal can or will be burned and the length of time fire should maintain maximum of requirements without attention.

NO DATA ON RELATIVE VALUE OF HEATING SURFACES IN CAST-IRON BOILERS

The conclusion is that no data on the relative value of heating surfaces in cast-iron boilers exist or can very easily be obtained at a cost commensurate with the results desired; therefore, the capacity of heating boilers should be determined by tests made under certain well-defined and standard conditions.

The power of a cast-iron boiler, when used for the purpose of heating residences and other buildings, is usually expressed in square feet of cast-iron radiators or radiation it will supply. This method of expressing the power of such boilers has, in all probability, been acceptable to the steam-fitting trade and to heating engineers, because the load or work to be done was usually calculated or reduced to the same terms.

Of late years there has been noticed a general agitation in favor of the heat unit for a conclusion as well as a basis in heat calculations. Such agitation has resulted in a general extension of knowledge and a very wide familiarity with the British thermal unit of heat and the accuracy as well as convenience attending its use.

A student of heat engineering as well as ventilation is compelled to recognize and understand the heat unit at the very commencement of his studies, and therefore drops it with reluctance on concluding his educational course and entering general practice.

All text-books and even papers and essays on heating and ventilation now refer to and use the heat unit, not as something mystifying or carrying an air of confusion, but as a necessity to any reasonably brief and conclusive argument, illustration or formula.

USE OF HEAT UNIT AS EXRESSION OF POWER IN HEATING BOILERS

In consequence of all this, the British thermal unit of heat is so well understood and correspondingly desired that there appears to be no longer any adequate reason or even argument why it should not be adopted as the expression of power in boilers used exclusively for heating purposes.

For immediate convenience it would be advisable to express the power in heat units and also in square feet of direct radiation, with note or explanation of the rule used in making the conversion from one to the other. This ratio of conversion will have to be set arbitrarily, because "square feet of direct radiation" means nothing definite and is nothing definite.

A review of the expressed opinions and observations of many members of this society and other authorities will show that so far as this term means anything at all it represents 250 B. T. U. when used for heating with steam up to 3 lbs. gauge pressure, or 150 B. T. U. when used for heating with water at 165° F. average temperature, the surrounding air being calculated at 70° F.

It would seem that the power of heating boilers expressed in B. T. U. and followed by an equivalent in square feet of direct radiation at a rate of 250 for steam and 150 for water would cover all requirements as well as objections for the present and would ultimately lead to the use of heat units exclusively. It is very certain that the competent engineer or steam fitter with a boiler under consideration whose power is expressed in B. T. U. will be able to make all his calculations in terms to correspond, and in that way to insure, to a certain extent, more accurate proportions and, in consequence, greater credit to himself and to the business at large.

Concluding that the use of B. T. U. for expressing the power of heating boilers is desirable, we must know for what length of time the capacity is available, calculating, of course, for a full charge of coal in the fire-box of the boiler.

A boiler's full power or potential is expressed correctly by the B. T. U. available on a run which consumes 80% of the entire charge of coal. This time may be 1 or 12 hours, or even more, in extreme cases. The rating, however, is made on an hourly basis, and the engineer must know on what length of run it is calculated before he can use the boiler for a given set of conditions.

LENGTH OF RUN OF BOILERS

The opinions as to the time for length of run are fairly uniform, and, as expressed before this society or in publications of recognized merit, seem to be in favor of a minimum run of 8 hours for those sizes of boilers used to heat ordinary dwelling houses, with an inclination to a shortening of the time as size of boiler increases.

The reasoning appears logical when we consider a business day is of 8 hours, and an ordinary house heater might expect attention at about the time such a day commences and ends. The night factor also fits in very nicely, because the majority of householders desire very little heat during hours of sleep, and, as a matter of common observation, generally check the fire. Should full heat be needed at night for sickness or other reasons, the 8-hour period just naturally divides the day into three equal parts and provides convenient intervals to give attention to fire.

For boilers and heaters used in the larger residences and in small schools or hotels an 8-hour run is not so essential, as in all probability a period of 7 hours would find no criticism among the users of such apparatus. The consideration of large boilers requires a 6-hour run for economy of installation, ease of operation, convenience of attendant, and general adaptation to the requirements of buildings in which they would likely be installed.

LENGTH OF RUN DETERMINED BY SIZE OF GRATE

The defining of the size boiler which shall be operated in the three foregoing divisions of time is best determined by size of grate, as follows:

Small boilers, less than 6 sq. ft. grate, 8 hours run.

Medium boilers, 6 to 10 sq. ft. grate, 7 hours run.

Large boilers, over 10 sq. ft. grate, 6 hours run.

The engineer selecting a heating boiler for which a time factor has been provided would naturally consider his particular installation to decide if the boiler he was about to select would develop the power at which it was rated under the conditions to which he was limited. No conclusion can be reached under this line of reasoning without a knowledge of the conditions which govern the test of boiler to determine its rating, and an intelligent comparison of such conditions with those for the installation under consideration.

COAL CONSUMPTION THE UNKNOWN QUANTITY

The unknown quantity in present published ratings of heating boilers is coal consumption, and this must be made standard before the engineer can judge as to the likelihood of his conditions making the same consumption possible with similar results as expressed in the boiler's B. T. U. capacity. A fairly wide difference of opinion is expressed on this point of coal consumption, but such opinions are quite uniform as to the advisability of distinction between heating boilers with the usual expectation of careless and sometimes most ignorant attendants, and those boilers made for and used in power work where more or less skilled firemen are employed.

LIMIT OF CHIMNEY DRAFT

Another feature, in fact, the feature which runs hand in hand with inefficient help, is the limit of chimney power for house heating boilers. It is undoubtedly true that a chimney of adequate draft must be provided for each installation; but, nevertheless, it remains obvious that such chimney requirements must be within reason and applicable to the design and construction of the class of buildings in which boilers under consideration are usually installed.

Leaving out of consideration the special case, be it good or bad, which a competent engineer can always calculate for, the records of this society and publications of recognized merit point clearly to a moderate rate of combustion as likely to meet with general approval in heating practice and to provide the greatest economy under average conditions.

A BASIS OF COAL CONSUMPTION

Keeping in mind again the ability of an engineer to suit his calculations to special requirements, the following basis of coal consumption seems obvious:

Small boilers, less than 6 sq. ft. grate, 5 lbs. coal per square foot of grate per hour.

Medium boilers, 6 to 10 sq. ft. grate, 5 to 6 lbs. coal per square foot grate per hour.

Large boilers, over 10 sq. ft. grate, 6 to 7 lbs. coal per square foot grate per hour.

This question is largely influenced by the handling of the coal, as well as the ability of the chimney to furnish draft. Considering the time factor as previously alluded to and the quantity of coal as just expressed in pounds per hour for each square foot of grate, we arrive at a total consumption of about 40 lbs. for each square foot of grate for one firing. This is the amount of coal to be actually consumed; therefore, we must add to it sufficient for a bed on which to ignite the new charge, such surplus usually being estimated as one-fourth of the amount to be consumed, or, in this case, 10 lbs., making a total charge of 50 lbs. for each square foot of grate. This charge of 50 lbs. has to be handled each 8, 7 or 6 hours, as the case may be, and looks like quite a substantial amount, when we consider that it figures up to 250 lbs., or one-eighth of a ton, as required for one charge on a boiler of 5 sq. ft. of grate area, such as would be suitable for the ordinary residence.

Coming back again to the draft, the charge of 50 lbs. for each square foot of grate provides a fuel bed which will average about 15 in. deep, 13 in. of which will be the new charge of fuel and 3 in. the old bed, which remains practically constant. Through this mass of fuel the chimney must exert itself to maintain active combustion, and experience with many hundreds of heating plants indicates 15 in. in depth of fuel as a maximum and makes it unsafe to expect average results if it is increased.

Accepting the full charge as 50 lbs., of which 40 lbs. is available for combustion, we find it regulates our coal-burning factor as follows:

Small boilers, less than 6 sq. ft. grate, 5 lbs. coal per square foot grate per hour.

Medium boilers, 6 to 10 sq. ft. grate, 5.7 lbs. coal per square foot grate per hour.

Large boilers, over 10 sq. ft. grate, 6.6 lbs. coal per square foot grate per hour.

FACTOR OF EFFICIENCY THE REMAINING CONSIDERATION

With the time factor set and the rate of combustion decided upon, the engineer now has to consider only the factor of efficiency to enable him to determine his own rating for any given boiler under any specified conditions, according to the following formula:

Small boilers, G × 5 × E = B. T. U. per hour for an 8-hour run.

Medium boilers, G × 5.7 × E = B. T. U. per hour for a 7-hour run.

Large boilers, G × 6.6 × E = B. T. U. per hour for a 6-hour run.

G is area of grate in square feet, E is efficiency in B. T. U. per pound of coal. For direct radiation, divide B. T. U. by 250 for steam. For direct radiation, divide B. T. U. by 150 for water.

The factor E should be supplied by the maker of the boiler; but, if not available, it can be determined by the engineer from any published rating, provided the area of grate is known and the coal consumption is accepted in accordance with the foregoing conclusions.

The formula for determining the value of E, from any given rating, is as follows:

B. T. U. ÷ (G × C) = E.

G is the area of grate in square feet, C is the coal in pounds per hour for each square foot of grate, E is the efficiency in B. T. U. per pound of coal.

For convenience in illustrating the practical ability of this method of rating boilers the accompanying schedule has been prepared to show the

SCHEDULE OF HEATING BOILER RATINGS FIGURED FOR 1 SQUARE INCH OF GRATE AREA

	Small Boilers.	Medium Boilers.	Large Boilers.	Total From B.T.U. 1 lb. Coal
Rate of combustion in pounds of coal per sq. ft. grate per hour	5	5.7	6.6	.....
100% efficiency B.T.U.	500	570	660	14,400
40% efficiency B.T.U.	200	228	264	5,760
40% efficiency Steam sq ft	.80	.91	1.06	5,760
40% efficiency Water sq. ft	1.33	1.52	1.76	5,760
45% efficiency B.T.U.	225	257	297	6,480
45% efficiency Steam sq. ft	.90	1.03	1.19	6,480
45% efficiency Water sq. ft	1.50	1.71	1.98	6,480
50% efficiency B.T.U.	250	285	330	7,200
50% efficiency Steam sq. ft	1.00	1.14	1.32	7,200
50% efficiency Water sq. ft	1.67	1.90	2.20	7,200
55% efficiency B.T.U.	275	314	363	7,920
55% efficiency Steam sq. ft	1.10	1.26	1.45	7,920
55% efficiency Water sq. ft	1.83	2.09	2.42	7,920
60% efficiency B.T.U.	300	342	396	8,640
60% efficiency Steam sq. ft	1.20	1.37	1.58	8,640
60% efficiency Water sq. ft	2.00	2.28	2.64	8,640
65% efficiency B.T.U.	325	371	429	9,360
65% efficiency Steam sq. ft	1.30	1.48	1.72	9,360
65% efficiency Water sq. ft	2.17	2.47	2.86	9,360
70% efficiency B.T.U.	350	399	462	10,800
70% efficiency Steam sq. ft	1.40	1.60	1.85	10,800
70% efficiency Water sq. ft	2.33	2.66	3.08	10,800

Small boilers, less than 6 sq. ft. grate area.

Medium boilers, 6 to 10 sq. ft. grate area.

Large boilers, over 10 sq. ft. grate area.

Coal charge, 50 lbs. per sq. ft of grate, of which 80%, or 40 lbs., is to be consumed in 8 hours for small, 7 hours for medium, and 6 hours for large, boilers. Theoretical value of coal is placed at 14,400 B.T.U. per pound for convenience in calculations on basis of 100 B.T.U. per sq. in. of grate for each pound of coal.

The percentage of efficiency should be adjusted for actual value of coal used in test, but rating remains constant for the B.T.U. available per pound of coal as stated in last column.

Steam radiation is figured 250 B.T.U. per hour.

Water radiation is figured 150 B.T.U. per hour.

Rating is for one hour, but available for each hour of entire run on one charge of coal, as indicated.

The rating is available at boiler outlet, load to be calculated from that point.

rating for heating boilers of varied efficiency, dividing them into three classes—small, medium and large—and covering the range of efficiency which might be expected.

Any rating for efficiency other than shown in the table can easily be figured by working back to the heat units available for each square inch of grate, and taking such percentage of it as test of boiler shows can be expected.

MANUFACTURER TO GUARANTEE EFFICIENCY UNDER THIS STANDARD RATING

The manufacturer who uses this standard rating should state and guarantee the efficiency under which he makes his calculations, such efficiency being reduced to the basis of 14,400 B. T. U. per pound of coal, combustion not to exceed rate specified.

The engineer installing the boiler must suit it to conditions at hand, no guarantee excepting for tested efficiency being required of the maker. This test should be standard and uniform in all cases and subject to the approval of a special committee of three engineers appointed by this society expressly for that purpose, who would, on request of a boiler manufacturer, witness such test as he might desire to make, and certify to the correctness of same; also the correctness of calculated efficiency for other sizes of same proportions.

The maker of a boiler should not expect this committee to be present at the preliminary tests, but only at final tests when the efficiency of the boiler has been decided upon and a certificate was desired to the effect that the boiler actually developed such efficiency by standard test in the presence of the majority of the members of the committee.

The expenses of the committee should be paid by the maker of the boiler, allowing only for transportation and hotel charges.

With such a standard rating guaranteed under uniform test, the manufacturer will be free to develop a boiler of the highest efficiency, and the engineer who designs the installation will be solely responsible for correctly applying the boiler to local conditions which are available.

Wednesday Afternoon, January 20

Before proceeding with the regular order of business, a letter was read from the Midland Club in Cincinnati, containing the report of an expert on the Collinwood School fire, proving that the catastrophe was not caused by a hot-air furnace.

President A. W. Glessner, of the Excelsior Steel Furnace Co., of Chicago, gave additional testimony, substantiating the report of the Midland Club, and calling attention to the report of the State Shop Inspector, John H. Morgan, to the Governor of Ohio, in which he states that the fire in the Collinwood School was due to the fact that it was the custom to oil the floors of the schoolhouse, and the necessary oil was stored in a barrel, the tools for its application being kept in a closet behind the basement stairs, providing just those conditions which are most favorable for spontaneous combustion and a rapid and intense fire when once it is started. The report also states that many schools are in no better condition in regard to the character of the material stored within the school building, nor is the plan and arrangement of the stairways any better than those found in the Collinwood School.

A statement in one of the magazines that the Collinwood school fire was caused by a hot air furnace led A. W. Williamson, president of the Midland Club, Cincinnati, O., an organization made up of furnace manufacturers, to make an exhaustive inquiry into the matter. A reply was received to a letter written to H. H. Gage, a member of the Board of Education in Collinwood, under date of January 2, 1909, in which Mr. Gage states:

"In answer to your inquiry in regard to the character of heating apparatus used in Lake View School, Collinwood, O., where the fire occurred March 4 last, and where so many lives were lost, will state:

"The heating apparatus used in the building was what is known as direct radiation steam heat supplied by two cast iron boilers of low pressure. There was

no hot air furnace or other heating apparatus in the building. I am making the above statement from positive knowledge, having been in the basement a great many times, both when the building contained only four rooms and was heated by one boiler, and after the additional four rooms were added and the second boiler installed to assist in their heating. There were no hot air flues in the building at any point, and in my opinion fire was not in any way caused by the heating apparatus. I am now and have been for four years a member of the Board of Education of this village, and for the last four months have been the clerk."

Added to this is the report from H. T. Brockman, assistant fire marshal of Ohio, made March 6, 1908, to First Deputy J. B. P. Brennan, which states:

"Mr. Feigenbaum and I went to Collinwood early yesterday morning with a view to determining, if possible, the cause of the calamity which occurred yesterday. Mr. Hiter, the janitor, is positive that the fire started in the storeroom immediately beneath the stairs. This theory is not well supported by reason of the fact that he claims to have had nothing in that room except a box of lime. The outer part of the box was burned, but the inner part showed no traces of a fire. Chief Wallace, of the Cleveland Fire Department, and myself spent considerable time in a very close investigation of the burned building. The debris had been cleared and an inspection could be made at this time. Chief Wallace is of the opinion that the fire was due to imperfect installation of the heating plant.

"The plant in question was a low pressure cast iron boiler of a type ordinarily used in these buildings, but the main steam pipe had been run through the wall, resting in part upon some joists or beams. His theory is that the constant and steady heat had caused the beams to become superheated, and that they had been burning for some considerable time before the smoke was discovered by the little Neubert girl. The asbestos covering of the pipe is of a very inferior grade, and appeared to be very largely composed of a cheap plaster which would not be fire resisting. This theory is thoroughly concurred in by Mr. Lougee (building inspector, Cleveland), who pointed out several serious defects for basing their conclusions as they have done. The beams immediately over the boiler are the only ones that show traces of complete combustion. The ends of the beams still running into the wall burned right close up to the brick work. In every other part of the building the beams when falling had torn out of the brick work, leaving vacant spaces and no portion of the woodwork behind.

Following a further discussion of the rating of house heating boilers, led by Prof. J. H. Kinealy, the following resolution, introduced by P. H. Seward and supported by Prof. R. C. Carpenter, was referred to the Committee on Standards:

Proposed Formula for a Standard Rating of House Heating Boilers

The B. T. U. capacity $= G \times C \times E$, G = area of grate in square feet, C = hourly coal consumption in pounds per square foot of grate, as follows: Small boilers, less than 6 sq. ft. grate, 5 lbs.; medium boilers, 6 to 10 sq. ft. grate, 5.7 lbs; large boilers, over 10 sq. ft. grate, 6.6 lbs. E = efficiency of boiler in B. T. U. available at outlet for each pound of coal consumed. The B. T. U. capacity, expressed in square feet of direct radiation, is to be computed as follows: B. T. U. $\div$ 250 = square feet steam radiation; B. T. U. $\div$ 150 = square feet hot water radiation. Capacity that should be available each hour of a continuous run on one charge of fuel is: Small boilers, eight hours; medium boilers, seven hours; large boilers, six hours. The resolution also included a suggestion that a rating committee be appointed to certify to manufacturers' claims of efficiency.

The next paper was entitled "Air Cooling by Refrigeration," by W. W. Macon (published in our January, 1909, issue).

Following this paper, the report of the Committee on Relative Corrosion of Wrought Iron and Steel Pipe was read by the chairman, Thomas N. Thomson (published in our January, 1909, issue).

The next paper, on "Notes on the Design of Furnace Heating Systems, with an Application to a 10-Room Residence," by Prof. I. D. Hoffman, was read by William G. Snow.

Thursday Morning, January 21

On motion of C. E. Oldacre, seconded by J. T. Bradley, it was voted not to have read the paper on "Miniature Steam Traps and Their Application to Steam Circulation," by James A. Donnelly; the motion reading: "In view of the nature of this paper, with

which every one is familiar, and of the articles in our constitution bearing thereon, it is a type of paper that will not contribute prestige or benefit to the society or its members. I move that it be referred back to the Board of Governors, with instructions that it shall not form any part of our proceedings."

ENDORSEMENT OF NEW YORK STATE FACTORY VENTILATION LAW

The special committee on legislation for New York State prepared a resolution which was ordered sent to the Governor and Legislature of New York. It was as follows:

Believing that compulsory ventilation of certain factory buildings as provided for in section 86 of Article VI of the Laws Relating to Labor and Factories is essential to the health and sanitary welfare of the employees, the American Society of Heating and Ventilating Engineers, in annual meeting assembled, heartily indorses the provisions of the law.

Thursday Afternoon, January 21

The first paper at the afternoon session was on "The Effect of Wind on Heating and Ventilating," by H. W. Whitten.

WIDER PUBLICITY OF THE NEED OF VENTILATION

As a step in the way of bringing the needs of ventilating to the attention of the general public, Samuel R. Lewis, who was appointed chairman of a committee for that purpose, submitted the following resolution, which was carried, and steps will be taken to furnish the public press with the information indicated:

Resolved, That it is the duty of the American Society of Heating and Ventilating Engineers to call the attention of the public to the necessity of adequate ventilation in all old as well as new buildings where persons congregate, such as schoolhouses, factories, halls and theaters, and that a central publicity committee of three be appointed, represented and assisted by one member from each state, whose duty it shall be to make continued and persistent effort to educate the public mind and to disseminate literature and information to the press, to the law-making bodies, colleges or any other organizations or persons through whom it is possible that the aims of our society toward proper ventilation may be advanced. S. R. Lewis,
O. L. Badger,
E. K. Munroe.

Following the formal installation of the newly elected officers, one of the important subjects discussed was the adoption of a question box. It was voted that questions submitted by members be distributed in printed form to the membership and that answers received up to within 60 days of the annual and semi-annual meetings be printed for distribution at those meetings.

The meeting then adjourned *sine die.*

Heating Engineers' Annual Dinner

Over 100 members and guests sat down to the annual dinner of the heating and ventilating engineers' society at the New Grand Hotel, New York, January 20. After a well-served dinner, for which a special menu had been prepared, bearing the society's emblem, Toastmaster James Mackay arose and in a few well-chosen words expressed the welcome of the society to all present.

The first toast, "The Engineer Abroad," was responded to by Secretary William Mackay, who read letters of good wishes from Former President E. P. Bates, Dr. Thomas H. Darlington, health commissioner of New York; D. M. Nesbit, of London; Councillor Hugo Erich von Boehmer, of Berlin; Gustave Debesson, of Paris; W. R. Maguire, of Dublin; and Capt. A. B. Reck, of Copenhagen.

D. D. Kimball, responding to the toast, "The Position of Our Society," said, in part:

"There was a time when one university in New York stated that the profession of heating and ventilation was not sufficiently important to be designated as a specific course of study. This is no longer true, and the advance is largely the work of the heating and ventilating engineer. In many cities we may now buy our heat as we buy our gas and electricity. The progress of ventilation is strikingly shown in the case of hospitals. In the Dublin Lying-In Hospital the death rate has been reduced from 50% to 5%, while in the Boston City Hospital the percentage in the surgical wards fell from 44% to 13%, and in other wards from 23% to 6%. Speaking from a commercial point of view, it has been shown

that, with good ventilation, it is possible to obtain 10% greater output on the part of employees. It is possible that some day the cost of electric cooking will become sufficiently low that we will be able to do our heating by electricity without cost. Also, we may take our refrigeration for cooling from street refrigerating lines."

Reginald Pelham Bolton spoke on "Our Opportunities." One of the opportunities of the future is in the line of developing gas producer plants to be used in heating houses. We have got to study that subject. People have been going on burning coal at a wasteful rate, but we are now commencing to realize that it is a limited product. In one large hotel building in New York they are burning 21 tons of No. 2 Buckwheat Anthracite a day. Our streets may not be lined with gold, but the houses on both sides are lined with golden opportunities for the heating and ventilating engineer.

"The Society's Aims" was discussed by Henry L. Doherty. "A great part of our work is accomplished," he said, "when we see the object of our work. A professional man is apt to attach less importance to his profession than it deserves. In the manufacture of internal combustion engines it was impossible to obtain one that would weigh less than 700 lbs. per horse power. The motor car came along and an engine of less weight was demanded. The problem was met with engines weighing 6¼ lbs. With the advent of flying machines even lighter engines were demanded, and we now have them 1¾ lbs.

"We are living in an age of heat. We speak of 11% efficiency in pumping work without realizing that it represents 1.6 lbs. of coal per brake horse power. Where coal is used as a fuel in the Joplin mining district, they use up one acre of coal every three days. The function of a technical society is to create pride of achievement. Men are urged on by pride and necessity, but mostly by necessity. The technical man can raise the efficiency of the ordinary human machine. As a society much can be accomplished through such agencies as a Question Box, a Wrinkle Department, which is a splendid field for the display of ingenuity, and by a Progress Department."

W. W. Walling, chief factory inspector for the State of New York, told of the efforts of his department in enforcing the New York State factory ventilation law. "The department," he said, "needs the services of a heating and ventilating engineer. The statute should be made more explicit regarding the amount of fresh air required." The speaker suggested a scheme of perforating the floor with small holes for ventilating purposes.

William G. Snow rose to the toast of "The Future of the Society." Mr. Snow took as his text the objects of the society as mentioned in its constitution. "We have not begun," he said, "to use the means at our disposal to economize in the use of heat. There is a large element of the public who want the best and are willing to pay for it." Mr. Snow concluded by sounding this keynote for the future work of the society, which brought forth a burst of applause:

"Let any commercial gain be a by-product of our campaign of education."

The last speaker of the evening, Prof. J. H. Kinealy, spoke to "The Ladies," and in some happy remarks sprung the story of the ladies who sent for three aisle seats in a theater, but found, on their arrival, that they were behind each other, on the aisle. One lady, turning to the gentleman sitting next to her, asked him if he was alone. Obtaining no answer, she repeated the question. At last he exclaimed: "Get wise, little girl, my wife is on the other side."

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

New Standing Committees

President William G. Snow has announced the following standing committees of the society to serve during the ensuing year:

Compulsory Legislation—John F. Hale, George Mehring, H. D. Crane, B. C. Davis and F. R. Still.

Standards—J. H. Kinealy, P. H. Seward, S. W. Densmore, R. P. Bolton and W. L. Bronaugh.

Tests—J. D. Hoffman, C. R. Bishop, Theodore Weinshank, C. Teran and R. A. Widdicombe.

A burnt wood reproduction of the society's emblem, which graced the desk of the presiding officer during the recent annual meeting of the society, was the handiwork of Mrs. George B. England, of New York, and was much admired. Smaller reproductions of the emblem were provided by Mrs. England as souvenirs for the visiting ladies.

In a letter received after the adjournment of the society's annual meeting, the German Society of Heating and Ventilating Engineers extended greetings, and added, "it would please us very much if you would send a number of your colleagues from North America to our Congress, which will take place in the middle of June at Frankfort-on-Main. We will accord these gentlemen an especially cordial welcome. The programme for our Congress I will send shortly." Conrad Hartmann, who signs the letter, is chairman of the committee, and the letter is written from Grunewald-Berlin.

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IT HAS long been recognized that there is need of a wider publicity in the lay press, so to speak, of the more essential features of modern methods of ventilation. But one of the difficult things for a technical man to do is to write in such a way that one who has no knowledge of the subject under discussion may be able to follow him. The lay press is thus forced to rely upon those who can, at least, write, trusting to their reportorial ability to transcribe faithfully the ideas and facts contained in the more or less involved statements of the technical man.

It is largely for these reasons that engineers generally have formed the impression that the columns of the daily press are forbidden ground when it comes to a discussion of technical subjects, which they are, to some degree, but not for the reasons usually assigned. As a matter of fact, nothing is more welcome in a newspaper office than a technical article on almost any subject, expressed in language "understanded of the people." Moreover, in these days of journalistic enterprise, an article of merit accepted by any of the large press associations, finds its way simultaneously and in an incredibly short space of time in the columns of hundreds of journals in the most widely separated parts of the country. The responsibility for technical publicity is, therefore, directly in the hands of the technical man and it will never be accomplished on any large scale without his coöperation.

APPROACHING the subject from the commercial point of view may be sordid, but it is, at least, definite. Anyone who will study the conditions of the air in some of the work-rooms in New York City, for instance, as disclosed in the report of the State Commissioner of Labor, connot fail to see that the proportion of 50 parts of CO_2 in 10,000, which was found in samples of air taken from any number of work-rooms, must have an effect on the efficiency of the workers that can be calculated in dollars and cents. Chief Factory Inspector W. W. Walling calculates that the reduction in efficiency of workers in such an atmosphere may be conservatively placed at 10%. If this can be clearly established to the satisfaction of the landlords and owners, it will become a matter of simple arithmetic to determine how soon an adequate ventilating system in such quarters will pay for itself.

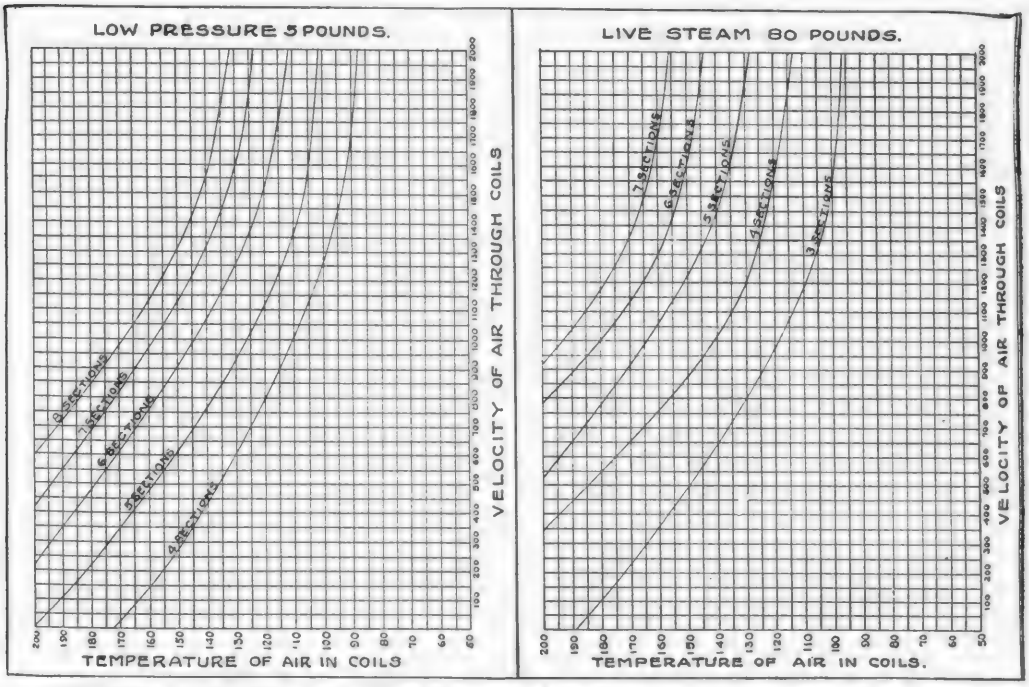
Let a campaign of publicity be inaugurated on that line, for it has what is so prized by the news editor, the valuable quality of "human interest."

Heating Power of Steam Coils

The amount of heat transmitted per square foot of heating surface from steam coils naturally depends upon the difference in temperature between the steam on the inside and the air upon the outside. But the air temperature close to the pipes is largely influenced by the rate of flow across the surface. When the air remains practically stagnant the condensation will be but a fraction of a pound per hour per square foot, but as the velocity increases so also does the condensation (which is a direct measure of the heat which is transmitted) and the condensation will run up into pounds per hour for the same surface area. Manifestly the higher the velocity the more rapid will be the rate of transmission; hence the primary advantage of the blower system of heating under which the air is compelled to pass rapidly across the surface of exposed steam pipes. The result is far greater efficiency per square foot than is obtainable with indirect steam heating.

The ultimate temperature given to the air passing across a stack of steam coils must depend not only on the steam pressure, but on the initial temperature of the air, and above all on the arrangement of the pipes. The less the depth of the heater, or the distance across which the air passes the greater will be the condensation, but the less will the temperature of the air be increased. Intensity of temperautre with a given steam pressure can only be obtained by depth of heater.

These relations are not generally known with exactness except by those directly interested in the manufacture and installation of such apparatus. Special interest, therefore, attaches to the accompanying curves from their private catalogue which are presented through the courtesy of the Massachusetts Fan Company, Watertown, Mass. Without going into details of construction or conditions these suffice to show that minimum velocity and maximum depth of heater are essential to intensity of temperature. Between



RELATION BETWEEN AIR VELOCITY AND AIR TEMPERATURE IN HEATER COILS

these extremes lies average practice with heater depths ranging from 4 to 6 sections (16 to 24 pipes), and velocity from 1,200 to 1,800 feet per minute.

The Weather for January

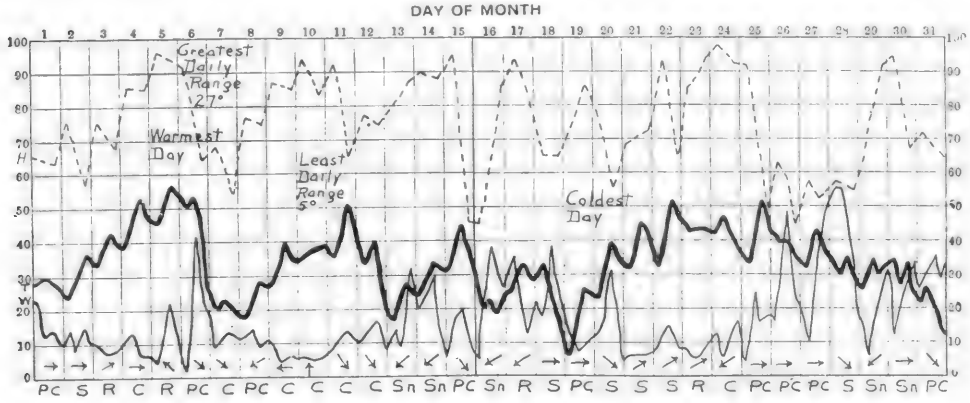
A continuation of mean temperatures above the average during January, following upon two similar months, has characterized the winter of 1908-1909 to date as one of the mildest in recent years. In all cities from which we receive reports the mean temperature for the month ran from 1° to 5° above the mean of this month for 39 years.

NEW YORK

Highest temperature, 57°, on the 5th; lowest temperature, 7°, on the 19th; greatest daily range, 27°, on the 6th; least daily range, 5°, on the 10th. Mean temperature for the month, 33°, 2° above the mean of this month for 39 years. Total precipitation for the month, 3.33 in., which is almost normal; snowfall, 9.5 in.; snow on ground at end of month, 3.4 in. Prevailing direction of wind, northwest; total movement, 10,241 miles; average hourly velocity, 13.8 miles. Clear days, 6; partly cloudy, 10; cloudy, 15. Rain or snow fell on 11 days.

BOSTON

Highest temperature, 60°, on the 5th; lowest temperature, 3°, on the 19th; greatest daily range, 32°, on the 6th; least daily range, 5°, on the 23d. Mean temperature for the month, 30°, 3° above the mean of this month for 39 years. Total precipitation, 3.94 in., a trifle more


DAY OF MONTH
Greatest Daily Range 27°
Warmest Day
Least Daily Range 5°
Coldest Day
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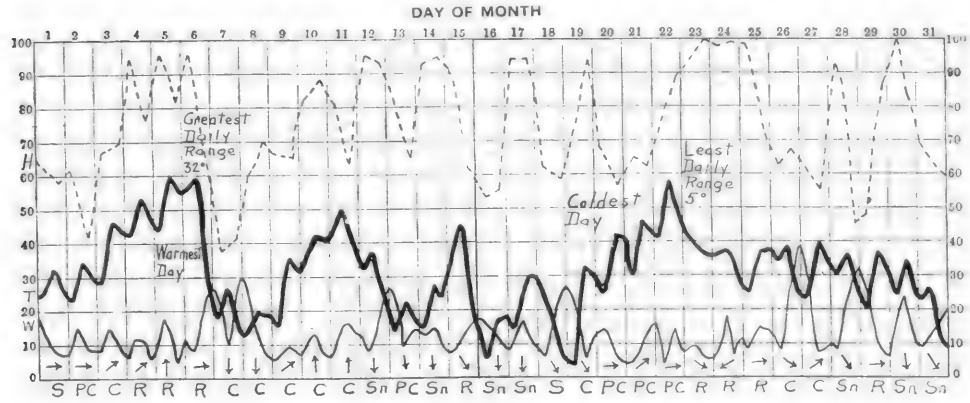
RECORD OF THE WEATHER IN NEW YORK FOR JANUARY, 1909


DAY OF MONTH
Greatest Daily Range 32°
Warmest Day
Least Daily Range 5°
Coldest Day
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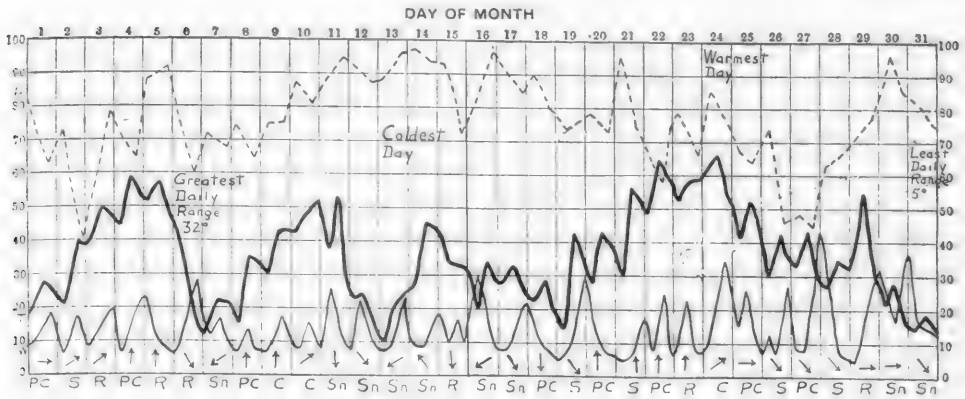
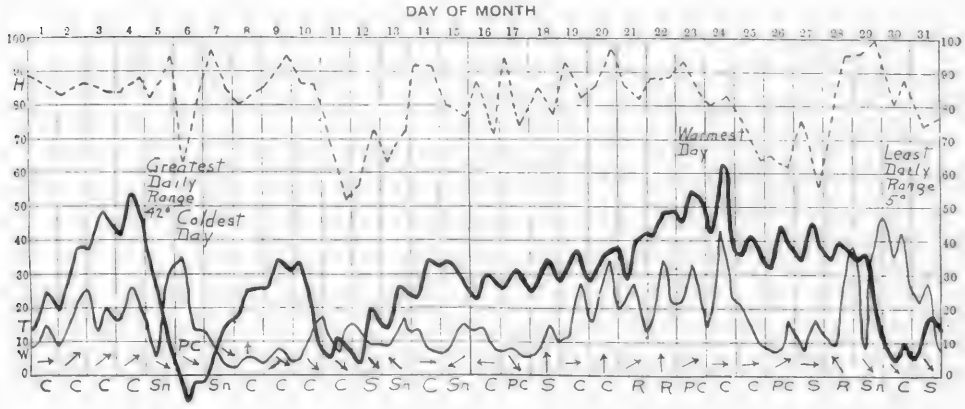
RECORD OF THE WEATHER IN BOSTON FOR JANUARY, 1909

Plotted from records especially compiled for THE HEATING AND VENTILATING MAGAZINE, by the United States Weather Bureau

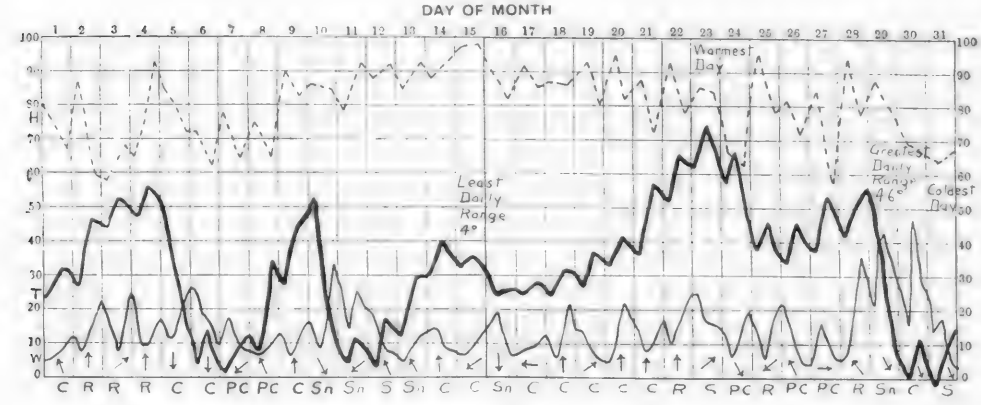
Upper line indicates temperature in degrees Fahr.
Broken lines indicates relative humidity in percentage from readings taken at 8 a. m. and 8 p. m.
Lower line indicates velocity of wind in miles per hour.
Arrows fly with prevailing direction of wind.
S—Clear. PC—Partly Cloudy. C—Cloudy. R—Rain. Sn—Snow.



RECORD OF THE WEATHER IN PITTSBURG FOR JANUARY, 1909



RECORD OF THE WEATHER IN CHICAGO FOR JANUARY, 1909



RECORD OF THE WEATHER IN ST. LOUIS FOR JANUARY, 1909

Plotted from records especially compiled for THE HEATING AND VENTILATING MAGAZINE, by the United States Weather Bureau

Upper line indicates temperature in degreos Fahr.
Broken lines indicates relative humidity in percentage from readings taken at 8 a. m. and 8 p. m.
Lower line indicates velocity of wind in miles per hour.
Arrows fly with prevailing direction of wind.
S—Clear. PC—Partly Cloudy. C—Cloudy. R—Rain. Sn—Snow.

than usual. There were 11.2 in. of snow, with 4.5 in. remaining on ground at end of month. Prevailing direction of wind, west; total movement, 8,739 miles; average hourly velocity, 11.7 miles. Clear days, 2; partly cloudy, 10; cloudy, 19. Rain or snow fell on 14 days.

PITTSBURG

Highest temperature, 66°, on the 24th; lowest temperature, 10°, on the 13th; greatest daily range, 28°, on the 19th; least daily range, 5°, on the 31st. Mean temperature for the month, 35°, 4° above the mean of this month for 38 years. Total precipitation, 3.10 in., a trifle more than usual. The snowfall was 16.3 in., of which 2 in. remained on the ground at the end of the month. Prevailing direction of the wind was south; total movement, 8,334 miles; average hourly velocity, 11.2 miles. Clear days, 5; partly cloudy, 8; cloudy, 18. Rain or snow fell on 15 days.

CHICAGO

Highest temperature, 65°, on the 23d; lowest temperature, 10° below zero, on the 6th; greatest daily range, 42°, on the 5th; least daily range, 5°, on the 30th. Mean temperature for the month, 29°, 5° above the mean of this month for 39 years. Total precipitation, 1.96 in., which is close to normal. Snowfall, 8.7 in., of which 3.8 in. remained on ground at end of month. Prevailing direction of wind, southwest; total movement, 10,158 miles; average hourly velocity, 14 miles. Clear days, 4; partly cloudy, 5; cloudy, 22. Rain or snow fell on 8 days.

ST. LOUIS

Highest temperature, 73°, on the 23d; lowest temperature, 1° below zero, on the 31st; greatest daily range, 46°, on the 29th; least daily range, 4°, on the 15th. Mean temperature for the month, 33°, 1° above the mean of this month for 36 years. Total precipitation, 3.20 in., ¾ in. more than usual. Snowfall, 13.6 in., of which 0.6 in. remained on the ground at end of month. Prevailing direction of wind, south; total movement, 8,680 miles; average hourly velocity, 11.7 miles. Clear days, 3; partly cloudy, 5; cloudy, 23. Rain or snow fell on 11 days.

New Publication

Industrial Progress, a monthly publication, has made its appearance, the initial number being dated January, 1909. The journal is issued from Milwaukee, Wis. Much taste has been shown in the typographical arrangement, a high standard being attained both in the character of the text and illustrations. The contents relate generally to power engineering. The subscription price is announced as $2.00 per year, or 25 cents per copy.

CORRESPONDENCE

The New York State Ventilation Law and Factory Ventilation

EDITOR HEATING AND VENTILATING MAGAZINE:

I understand that there is or has been recently past a law treating on ventilation in the State of New York, which is described in pamphlet, laws relating to labor, factories and mercantile establishments, Paragraph 86, Page 36. The question arises after reading this law, what constitutes a room properly ventilated? A great many people are under the impression that if they open a door occasionally, they have ventilation; others, if they open a window occasionally, they have ventilation; others, if they provide a fan in wall, either blowing in air or exhausting air, imagine they have ventilation.

The great trouble in ventilation is, if there are quite a number of people in a room and there are obstructions, such as desks, machinery, tables, etc., with people scattered all over the room, to get air to the different parts of the room and avoid drafts. Again, with these obstructions as above mentioned standing promiscuously around the floor and the air being exhausted out of said room, the warm air is drawn out at ceiling and the occupants of the room are sitting in the foulest imaginable air. The fan, in this case, exhausting from room is an absolute failure as far as ventilation is concerned.

According to Paragraph 86 there is not any quantity of air prescribed per occupant or per cubic contents. I believe this is absolutely necessary. In other words, allow a certain number of cubic feet per hour per person, or a certain number of cubic feet replacement per cubic contents, same to be introduced so that every occupant in the room gets a proportion. It is absolutely necessary in order to ventilate a room to provide an inlet as well as an outlet for said room. In some cases it is preferable to force the air into the room; in others it is preferable to exhaust the air from said room. In one case one will give the best results, and in the opposite, the other gives the best results; this depends on the conditions.

Every few days the writer is called from one place to another where the above conditions come up, and, in some instances, it runs into quite a few dollars. To install a ventilating system that will give results, the party considering this ventilating system hesitates in spending the money, and we can recall instance after instance where some incompetent,

not competitor, or some metal shop, carpenter or brick mason advocates putting a flue or a ventilator on the roof, or other contrivances which does not cost as much as a ventilating system, and in a great many instances same is installed and proves a complete failure.

It is safe to say that 20% of our business is overhauling defective ventilating plants. This applies to some of the finest buildings in our city and surrounding cities.

The object of writing this letter is to prevent as far as possible this loss of money to people who are now compelled to provide a ventilating system. In most instances, they do not know what constitutes a ventilating system or what is wanted or how to do it, and there are a great many would-be ventilating concerns that know absolutely nothing about ventilating. I believe that for the protection of the people, that are spending their good money, all ventilating contractors or engineers should be licensed by the State, county or city, and they should also pass an examination to see that they are competent to meet such conditions. Furthermore, I believe that they should show at least one plant which they have laid out, installed and which is operating and performing certain results.

The writer has overhauled many ventilating systems that were installed by other parties which have proved failures; in some instances the cost running as high as $10,000. This is an enormous sum of money to pay out for a system that is a failure, and calls for the attention of all heating and ventilating engineers and authorities of the State to consider the above remarks, so as to give the people something for their money. The writer knows of no better way to get at this than to examine and license all parties posing as ventilating engineers.

The writer is informed that in several instances when the factory inspector recommends a system of ventilating, the question is put to them in this way: "What do you recommend? Give us a layout so we know what to do." It is hardly expected that the average factory inspector is a heating and ventilating engineer, and it is a well-known fact that the people of to-day know less about ventilating and pure air than anything else that I come in contact with every day of my life. This may be overcome if all ventilating engineers are recorded in each town or locality. Then all that is necessary for the factory inspector to do is to refer them to the list of ventilating engineers. In this way I believe the above proposition can be handled to the best of advantage to the community at large. C. H. BICALKY.

Buffalo, N. Y., Jan. 29, 1909.

A Word of Appreciation

EDITOR HEATING AND VENTILATING MAGAZINE:

It seems only fair to say to you that I think your magazine is one of the best that comes into my office. I always find one or two articles not only worth reading but worth keeping. P. R. MOSES.

New York, January 23, 1909.

NEW DEVICES

Design of the Webster Air Washer

The accompanying illustrations show interesting features in the construction of the Webster air washer. The spray device, for instance, which has not heretofore been illustrated, is of ingenious construction, special attention being paid to the necessity of making it non-clog-

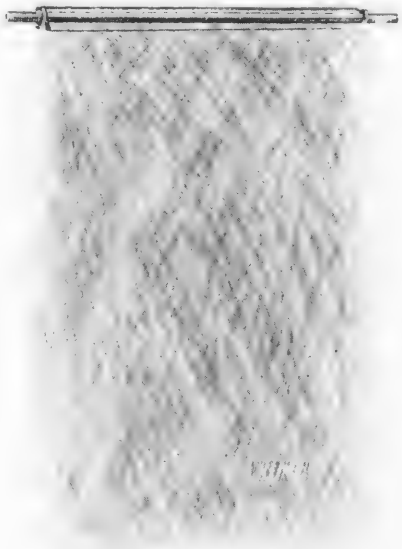


FIG. 1.—APPEARANCE OF WATER SPRAY IN WEESTER AIR WASHER

gable. It is especially designed so that foreign matter ordinarily present in the water, due to the removal of dust and soot from the atmosphere, will not choke up the spray openings and render the apparatus inoperative. The spray openings are at least 7-32 in. in diameter.

The spray device is made of brass and copper; the spray pipe being made of brass, with properly placed spray openings, and the spray hood of copper, the mechanical construction being such that each spray head produces two sheets of

water having a combination "rain-and-spray" effect.

The engineers engaged in the development of the device have tested all kinds of spray "effects," from fine mist to coarse sheets of "rain," and have found the combination "rain-and-spray" effect to give the best results in washing or cleansing.

Fig. 1 shows how thoroughly the tiny streams of water cross each other at angles, which gives the spray the effect of driving rain. This slanting direction is preserved for practically the full height of the spray chamber, due to the mechanical construction of the spray device.

Fig. 2 shows a section through the spray device, showing the shape of the hood which deflects the many streams of water. It will be noted that the spray is not diffused until the lower portion of the spray chamber is reached.

The eliminator baffles in the Webster air washer are horizontal in form, which has an important advantage in that there is absolutely no chance for the water and dirt which has been removed from the

FIG. 2.—SECTION THROUGH SPRAY DEVICE

upper strata of air to come in contact with the lower strata, and thus be carried through the eliminator.

Each eliminator baffle is slightly inclined and is independently drained to the tank, through a vertical gutter at the side.

Fig. 3 shows the general construction and arrangement of the eliminator chamber, the air entering in the direction indicated by the arrow.

The baffles are usually constructed of heavy galvanized iron, but may be made of heavy sheet copper, if desired.

Webster air washers are furnished either with or without a galvanized iron or heavy copper water tank or sump, ex-

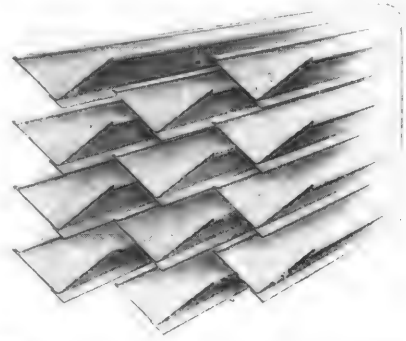


FIG. 3. ELIMINATOR BAFFLES OF WEBSTER AIR WASHER

tending below the entire spray and eliminator chambers.

The tank is provided with a double brass box strainer, for the purpose of keeping foreign matter removed from the air from entering the pump and being forced into the spray device. The strainer is easily accessible for cleaning.

A ball tank valve is provided, for automatically admitting fresh water to take the place of that lost by evaporation, maintaining a constant water level in the tank. A drain and overflow connection is also furnished.

When a concrete tank is used, a double brass cylindrical strainer is furnished which is connected to the pump suction. A cast iron drain fitting is also provided.

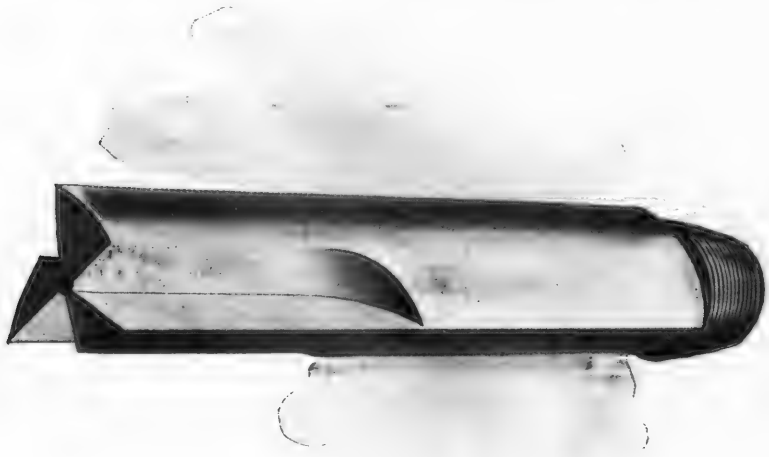
A Three-Cornered Bit That Bores Square Holes

The use of square holes in the woodworking industries is quite general, but the means heretofore employed for producing these holes might almost be called primitive, inasmuch as they usually consist of two operations, viz., the boring of a round hole, which is then cut out to a square hole. All this is to be changed, according to the introducers of a new German device, which is illustrated herewith.

This machine will not only bore a square hole, but also triangular holes and holes of five, six or more sides. This is accomplished without any other complication than a special type of drill and chuck. Referring to the boring of square holes, the tool consists of a three-cornered drill having a three-cornered shank, this tool being used in a special chuck, constructed as follows: There are

three parts of the chuck capable of independent motion; first, the part which is fastened rigidly on the end of the spindle of the lathe, drill or milling machine or other machine upon which the work is to be done; second, a stationary part which rides upon and is supported by the part first mentioned. This stationary part contains a square guide which can be adjusted to the size of the tool being used and to the hole to be bored. The third part is the one into which the shank of the tool is screwed. It is caused to rotate by the first part of the chuck, but is free to move sidewise a certain amount.

The shank of the tool is so shaped that it turns about in the square hole without play, and so that when turned the corners of the tool will sweep out the sides of a square. The three sides of the shank



THREE-CORNERED DRILL FOR BORING SQUARE HOLES

are segments of circles, the centers of which are at the opposite corners of the shank. The radius of these circles is just equal to the side of the square to be bored, so that when the shank rolls or slides upon one side of the square guide the opposite corner of the shank moves in a straight line.

A little study of this motion will show that it is modified at the very corners and the tool described will therefore give square holes with slightly blunt corners. If it is desired to obtain square corners, this can be remedied by using a drill having a specially large shank, one corner of which is rounded off. Such a tool, if correctly proportioned, will bore sharp-cornered holes that will be exactly square. This idea is applied not only to woodworking but also to the boring of holes in cast iron, steel and brass and other metals and in stone.

Hundreds of the machines are in use in Germany, and companies have been formed to introduce the device into England, France and America. The American firm is known as the Radical Angular Drill Co., and is now exhibiting a milling machine equipped with one of these chucks at its show rooms, Engineering Building, 114 Liberty street, New York.

Business Chances

Washington, D. C.—Sealed proposals will be received at the office of the Supervising Architect, Treasury Department, for the following-named work:

Until Feb. 17, 1909, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of the U. S. Post Office at Salisbury, N. C.

Until Feb. 18, 1909, for the construction complete of the U. S. Post Office at Greenville, Miss.

Until March 9, 1909, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of the U. S. Post Office at Elizabeth, N. J.

Until Feb. 23, 1909, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of the U. S. Post Office and Court House at Roanoke, Va.

Until March 3, 1909, for the construction complete (except elevator) of an extension to the U. S. Post Office, Court House, etc., at Augusta, Me.

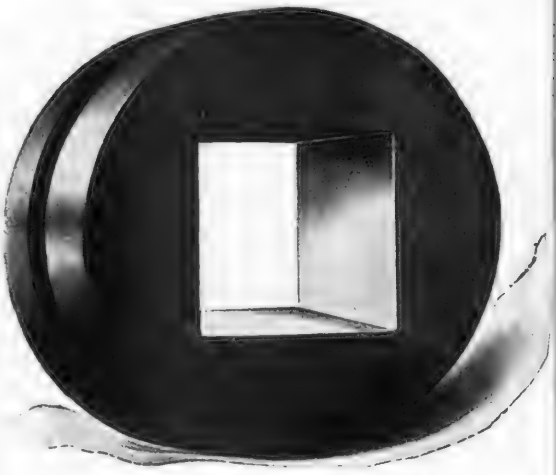
A Compound for Repairing Iron and Steel

Thousands of dollars are spent every year replacing machinery and parts, castings, radiators, boilers, fire pots or pipes which have become useless because of cracks, spongy spots, sand holes or blow holes. A product which the H. W. Johns-Mansville Co., New York, is placing on the market under the name "Leak-No Metallic Compound" is designed to make it possible to repair such defects in iron and steel.

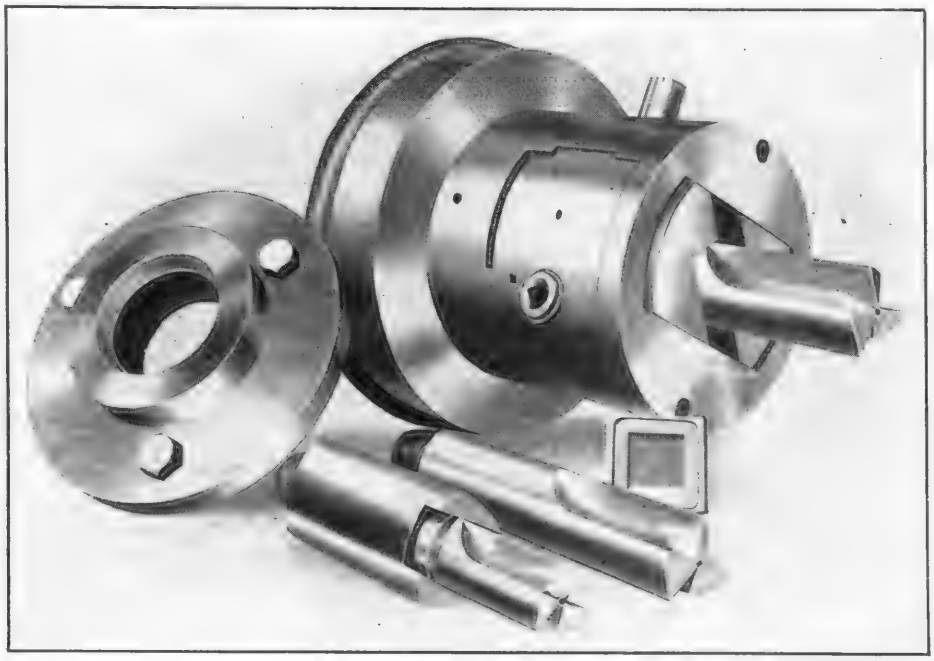
Leak-No is a chemical compound resembling powdered iron. When mixed with water and applied like putty to defects in iron or steel articles, the manufacturers claim that it metalizes and becomes a permanent part of the article to which it is applied. In color it very much resembles iron, when hard.

A neat folder which the manufacturers have issued, fully describing this material, can be had for the asking.

J-M Asbestos Pipe Coverings and J-M Sectional Conduits for underground pipes are brought to the attention of the trade in newly issued circulars published by the H. W. Johns-Manville Co., New York. The figures are given of a recently conducted test covering bare pipe, pipe with ordinary covering and pipe with J-M high-pressure covering. The results of this test, which appeared in the official publications of the American Society of Mechanical Engineers, showed a saving in coal consumption, where the J-M high-pressure covering was used, of 36 per cent. over ordinary covering and 600 per cent. over bare pipe. In addition to giving the details of this test, the circular illustrates and describes J-M Asbesto-Sponge felted sectional pipe covering, J-M Asbestos fire-felt covering for high-pressure and superheated steam, J-M Magnesia pipe covering, J-M Vitribestos sectional pipe covering and J-M Asbestocel sectional pipe covering. A typical installation is shown of J-M sectional conduit for underground pipes.



SAMPLE OF WORK DONE BY RADICAL ANGULAR DRILL



CHUCK WITH DRILL BIT FOR BORING SQUARE HOLES

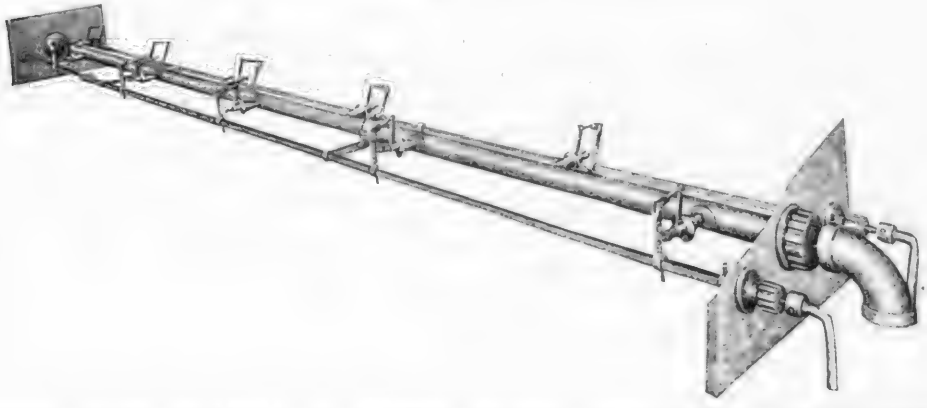
TYPE "A" McCREERY AIR WASHER

The McCreery Air Washer

A type of air washer that differs considerably from those previously shown in this department is known as the McCreery air washer, and is made by the McCreery Engineering Co., Toledo and Detroit. In this washer the principle has been adopted of providing a circulation through the spray heads of an ample volume of water, in order to obtain the most effective results in cleansing, humidifying and cooling. While the presence of a fine mist in the cleansing chamber is recognized as a useful adjunct in obtaining the results desired, yet it is claimed that the highest efficiency under all three requirements is only reached with the use of broken streams and sheets of water.

Acting on this principle, the McCreery air washer is constructed to cause the incoming air to take a curved path through several successive splashing sprays and falls, which maintain continuous films of water over concave deflector sheets.

The spray head is designed to throw a radial sheet of water, and it is so arranged that it can be flushed at will. The flushing operation may be controlled by hand or made automatic.



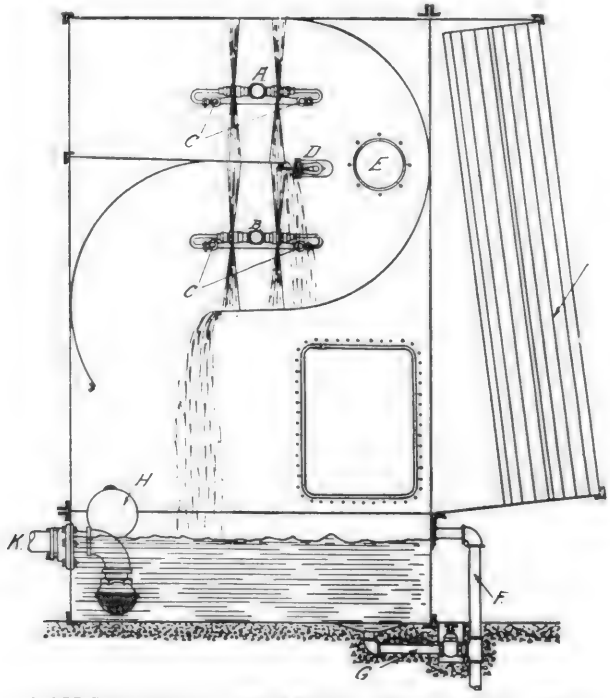
SPRAY HEADS, McCREERY AIR WASHER, SHOWING HAND CONTROL FOR FLUSHING

Trade Literature

Kinealy Air Purifier and Humidifier is the title of a 24-page catalogue, published by the Kauffman Heating & Engineering Co., St. Louis, Mo. In addition to a description of the air purifier, with numerous views showing features of its design, the catalogue contains photographs of some of the buildings in which it has been installed. The catalogue closes with directions for specifying the Kinealy air purifier.

Webster Air Washers and Humidifiers are described and illustrated in a newly-issued folder, published by Warren Webster & Co., Camden, N. J., the illustrations showing in detail the construction and operation of the apparatus.

Kelsey Heating Co., Syracuse, N. Y., in its Booklet No. 5, calls particular attention to a series of tables included in



CROSS-SECTION OF McCREERY AIR WASHER, SHOWING USE OF PRESSURE SPRAY HEADS

the booklet, giving all the particulars regarding dimensions, square feet of heating surfaces to each square foot of grate surface, total heating surfaces, weights and estimated capacities of each size generator, adding "information of this kind is not published about furnaces, and the dealer or intending purchaser who will carefully investigate must realize that there are good and conclusive reasons why the Kelsey will give more heat, better heat, and will burn less coal than any furnace." The booklet includes also detailed information as to the different methods of installing the Kelsey warm air generator, together with a number of views showing its use in connection with fan blast systems.

Current Heating and Ventilating Literature

Under this heading is published each month an index of the important articles on the subject of heating and ventilation that have appeared in the columns of our contemporaries. Copies of any of the journals containing the articles mentioned may be obtained from THE HEATING AND VENTILATING MAGAZINE *on receipt of the stated price.*

FEED WATER HEATING

Means and Methods for Heating the Feed Water of Steam Boilers. Reginald P. Bolton. Eng. Mag.—Dec., '08. 11 figs. 3,500 w. Gives a study of the actual economy of feed water heating. 40c.

Second article, Jan., 1909. Ills. 2,000 w. 40c.

ELECTRIC HEATING

Commercial Electric Heating. John Roberts. Considers a change in methods of distribution necessary and gives suggestions. 3,500 w. Inst. of Elec. Engrs.—Nov. 26, 1908.

POWER PLANTS

Power Plant and Heating System of U. S. Naval Hospital, New Fort Lyon, Col. A. P. Ball. Brief illustrated description of a plant for a group of buildings. 1,200 w. Elec. Wld.—Dec. 19, 1908. 20c.

Power Plant of St. Luke's Hospital, Chicago. Osborn Monnett. Illustrates and describes a plant containing special heating and ventilating features. 2,500 w. Power—Dec. 15, 1908. 20c.

Design of a New Heating and Power Plant for the University of Minnesota. Presents the general layout of machines and apparatus for a plant to heat a group of buildings. 2,000 w. Minn. Eng.—Nov., 1908. 40c.

TEXTILE MILLS

Heating, Cooling, Moistening and Renewing the Air of Textile Mills (Die Erwärmung, Kühlung, Befeuchtung und Erneuerung der Raumluft in der Textilindustrie). E. Stadelmann. A practical discussion of methods. Ills. 5,500 w. Gesundheits-Ing.—Nov. 14, 1908. 60c.

TRADE AND MISCELLANEOUS NOTES

Coming Events

Meeting of the Eastern Supply Association, Hotel Astor, New York, February 17, 1909.

Deaths

William W. Hunt, Amherst, Mass., an old-time master steam fitter and plumber and founder of the Mutual Plumbing & Heating Co., at that place, died January 8, at the age of 78 years. He is survived by a widow.

Joseph McWilliams, head of the firm of Joseph McWilliams & Co., Louisville, Ky., heating, ventilating and plumbing contractors, died January 19, of pneumonia. He was 46 years old and was a prominent figure in the trade.

Miscellaneous Notes

Chicago—Parallel bores, one for each track, will be a feature of the new tunnel under the river at La Salle street, work on which will be begun this year. This idea in construction, according to Bion J. Arnold, the engineer, is designed to solve the problem of ventilation in underground transportation, as the cars will go through the tunnel in one direction only, thus acting as air pistons.

Charles City, Ia.—The city council has granted a heating franchise for a gas heating plant at that place. Mr. R. K. Runner, of Freeport, Ill., is the principal interested party.

Dillon Plumbing & Heating Co., Dillon, Mont., has made formal application to the city council to install a central heating plant in Dillon. It is planned to build a one-story building, 50 x 80 ft., the equipment to include four 100 H.P. boilers. The main supply piping is designed to be 10 in., and the return piping, 5 in.

Waukesha, Wis.—Preliminary plans for the new electric power and steam heating plant for the Gas & Electric Co. have been drawn. The new power house will cost $55,000.

Chicago, Ill.—The Chicago health department has inaugurated a reform in the ventilation of the city's street cars by stipulating that "we require for perfect ventilation at least 28,000 cu. ft. of air an hour, entering at the floor line, being

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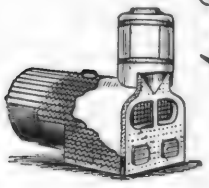

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heated there or before it passes into the car and being taken out at as many points along the ceiling as possible. We also require that this ventilation should go on at all times, whether the car be in motion or not, providing passengers are present." As a result of this ruling, tests of a number of systems for ventilating the street cars have been tried, including the Cooke, Taylor, McGerry and Perry systems, one of which will be adopted by the board of supervising engineers.

James Ballantyne Co., Ltd., Winnipeg, Man., suffered a loss of $50,000 January 6, when its heating and plumbing establishment was destroyed by fire.

United Bunch of Sheep, Milwaukee, Wis., an organization of heating and plumbing supply salesmen, held its annual banquet and meeting in Milwaukee, electing the following officers: Grand ram, David W. Johnson, Milwaukee; grand vice-ram, N. D. Garnsey, Madison, Wis.; chief shearer, James Brady, Milwaukee; grand keeper of the fleece, L. M. Kornreich, Milwaukee; national organizer, James T. Ketchum, U. S. Heater Co., Detroit, Mich. A "fold" of the organization will be formed in Chicago.

Washington, D. C.—The following amendment to the gas water heater regulations have been adopted on the recommendation of Henry B. Davis, chief inspector of plumbing, as the result of recent fatalities due to the generation of carbon monoxide by a gas water heater:

"All gas water heaters shall be provided with a door through which the gas burner and all of the heating surface shall be exposed for the purpose of lighting and cleaning, and said heaters shall be provided with a flue pipe, to carry off the noxious odors emanating therefrom to the outer air.

"The use of pilot lights on water heaters is absolutely prohibited, except for large water heaters, automatically operated by thermostat.

"The shuttle on the mixing valve shall be so constructed as to prevent the possibility of disarrangement due to carelessness, expansion or contraction, yet be accessible and easily controlled.

"The heater shall not be set closer to the floor than 2 ft. 6 in., measuring from the top of the burner.

"When complaint is made of existing gas water heaters, they shall be made to conform to the above requirements, or be replaced with heaters of approved type."

Canadian Asbestos Co.'s plant, Lachine, Canada, was destroyed by fire January 19. The loss is $40,000.

WASHED AIR FOR BANKS

Here is a list of representative banking houses that are not satisfied with using the dusty, smelly air of the street to ventilate the rooms on which so much money has been expended for decoration, and in which so many valuable workers must live.

BANK OF COMMERCE.....Kansas City, Mo.
CHICAGO NATIONAL BANK.....Chicago, Ill.
COMMERCIAL NATIONAL BANK.....Chicago, Ill.
COMMONWEALTH TRUST CO. Philadelphia, Pa.
CORN EXCHANGE NATIONAL BANK. Chicago, Ill.
FARMERS' & MERCHANTS' BANK. Minneapolis, Minn.
FIRST NATIONAL BANK.....Chicago, Ill.
" " " .....Cleveland, O.
" " " .....Kansas City, Mo.
" " " .....Boston, Mass.
" " " .....St. Paul, Minn.
GUARDIAN TRUST BUILDING.....Cleveland, O.
IMPORTERS' & TRADERS' NAT'L BANK N. Y. City
JENNINGS DAY AND NIGHT BANK....Chicago, Ill.
KUHN-LOEB & CO.....New York City, N. Y.
LACLEDE NATIONAL BANK.....St. Louis, Mo.
LAND & TITLE BUILDING.....Philadelphia, Pa.
NATIONAL GERMAN-AMERICAN BANK, Wausau, Wis.
NORTHWESTERN BANK BLDG...Minneapolis, Minn.
NOVA SCOTIA BANK.....Toronto, Ont.
OLD COLONY TRUST BUILDING.....Boston, Mass.
SUFFOLK BANK.....Boston, Mass.
THIRD NATIONAL BANK.....Chicago, Ill.
WESTERN GERMAN BANK.....Cincinnati, O.

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THOMAS & SMITH, 17-19 So. Carpenter St., CHICAGO

New York, 288 Hudson St.....L. THOMAS
Cleveland, Hickox Bldg....McDONALD BROS.
Detroit, Majestic Bldg.....McDONALD BROS.
Minneapolis, Security Bank Bldg.,
GEORGE A. YOKOM CO.
St. Louis, Chemical Bldg .... T. J. PETERS CO.
Kansas City, Mo., Postal Bldg.,
KANSAS CITY ENGINEERING CO.
Pittsburg, 1101 Park Bldg., J. A. LEIENDECKER
Boston, 88 Broad St....BENJAMIN K. HOUGH
Philadelphia, Bailey Bldg.,
THOS. KOLISHER ENG. CO.

Manufacturers' Notes

Stanley G. Flagg, Sr., founder of the firm of Stanley G. Flagg & Co., manufacturers of malleable iron pipe fittings and castings, has retired. The business continues under the direction of his son, Stanley G. Flagg, Jr., who has been associated with the firm since 1882.

Jenkins Bros., New York, has appointed Samuel Laird as temporary manager of its Philadelphia office, owing to the death of Harry G. Logan, the former manager, who died in January.

J. L. Mott Iron Works, New York, announces the removal of its Philadelphia office to new quarters in the Commonwealth Building, at Twelfth and Chestnut streets. Clark Kendrick is in charge.

O. P. Simler, secretary of the Union Radiator Co., Johnstown, Pa., has resigned.

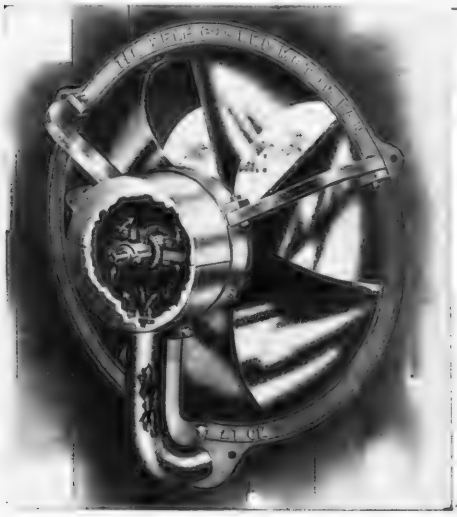
Abendroth Bros., Porchester, N. Y., announce the appointment of E. O. Haskins as manager of their boiler department in the New York office, succeeding Lewellyn Moore.

Kellogg-Mackay Co., 19-33 West 18th street, Chicago, is the changed title of the Kellogg-Mackay-Cameron Co., the firm having acquired the interests of some of its former members.

Crane Co., Chicago, has acquired the interests of the Frank Prox Co., manufacturer of boilers and jobbers of steam, plumbing, mill and mine supplies at Terre Haute, Ind. The company's line of boilers include the Radium, Economic and Economic Heavy Duty boilers for McGill, former city salesman for the steam and hot water heating. Robert Crane Co., is in charge.

American District Steam Co., Lockport, N. Y., elected the following officers at the recent meeting of its stockholders: President, Wm. Wells, Chicago; vice-president, G. C. St. John, New York; secretary and general manager, Charles R. Bishop, Lockport; treasurer, Robert Ham, Lockport. Mr. Wells, the new president, succeeds the late I. H. Babcock. He was formerly general manager of the Holly Mfg. Co., Lockport, and built up the Westinghouse business in England.

Jewell Manufacturing Co., Auburn, N. Y., manufacturer of the Jewell temperature controller, has instituted suit against C. H. Sanborn, of Boston, and the Howard Thermostat Co., of Oswego, N. Y., for manufacturing a time clock attachment for thermostats which is an alleged infringement on patents owned by the Jewell Manufacturing Co. The company also contemplates bringing further actions against manufacturers, sellers and users of time clock attachment infringements.



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OR BOILER DRY-PIPE
DRY STEAM—SAFETY—ECONOMY
POTTER SEPARATOR CO., Newburgh, N.Y. N.Y. OFFICE: 39 Cortlandt St.

American Blower Company Consolidates With Sirocco Engineering Company

American Blower Co., Detroit, Mich., has consolidated with the Sirocco Engineering Co., New York, manufacturer of the Sirocco fans and blowers. Under the consolidation the business of both concerns will be carried on under the name of the American Blower Co., with the main offices at Detroit. The capitalization of the American Blower Co. has been increased from $500,000 to $1,500,000, and the company has been incorporated under the laws of New York. William C. Redfield, president of the Sirocco Engineering Co., and Charles H. Gifford, formerly general manager of the B. F. Sturtevant Co., have been elected vice-president and treasurer, respectively, of the American Blower Co. S. C. Davidson, the inventor of the Sirocco fan and in charge of the Sirocco Works in Belfast, is also interested in the new consolidation. The Sirocco Company's plant at Troy, N. Y., will be continued in full operation.

New Incorporations

John Westwick & Co., Chicago, capital, $2,500; to deal in heating and power appliances. Incorporators: J. W. Westwick, V. A. Smith and Charles K. Rouse.

I. Bucceri Mechanical Ventilating Co., Brooklyn, N. Y., capital, $25,000; to manufacture ventilators and fans. Incorporators: Ignazio Bucceri, Pietro Randazzo and Pietro Sciame, all of Brooklyn.

Daniel Almond Co., Brooklyn, N. Y., capital, $25,000; to conduct a heating and plumbing business. Incorporators: Thos. O'Connell, Daniel Almond and Peter J. Hoffman.

Mechanics Plumbing & Heating Co., Livingston, Mont. Capital stock, $20,000.

CENTRAL STATION AND INDUSTRIAL HEATING PLANTS
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UNDERGROUND CONDUIT AND INSULATION. GREATEST CAPACITY, EFFICIENCY AND HIGHEST CLASS OF CONSTRUCTION ARE THE DISTINCTIVE FEATURES THAT MAKE

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W. H. SCHOTT, ENGINEER CHICAGO

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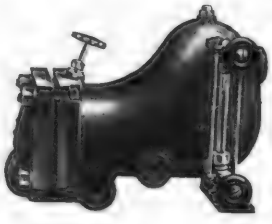

When you need a Steam Trap buy one you know will work. With a McDANIEL we take all the chances. Don't pay until you are satisfied. We have been 25 years manufacturing Steam Traps and know there is no better trap made. May we send you one for trial?

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Through the Use of the

TORRIDOOR HEATING SYSTEMS

As adapted to the various conditions covering the heating field they are ideal and unique, comprising all the advantages of older systems, without the disadvantages inherent to past methods, providing pure air for breathing, sectional radiation, power for domestic utilities and hitherto unknown reduction in fuel costs.

Engineers and Architects are invited to inform themselves as to their merits.
For personal interviews and other information address

THE TORRIDOOR POWER, LIGHT & HEATING CO. OF AMERICA, Home Office, East Orange, N. J.

Ideal Plumbing & Heating Co., West Hoboken, N. J. Capital stock, $25,000. Incorporators: Simon Brucelarie, Edward McConnell and Alfred R. Neff.

Williams Heating & Plumbing Co., Westfield, N. J. Capital stock, $5,000. Incorporators: James E. Grape, Harold Thompson and Edward S. E. Randolph.

Toledo Heating Appliance Co., Toledo, O. Capital stock, $10,000. Incorporators: C. H. Carsten and others.

Pittsburg Supply Co., Fort Smith, Ark., capital $50,000, to deal in heating and plumbing supplies and lighting appliances. President, E. C. Lichty; vice-president, J. B. Weatherton; secretary and treasurer, P. C. Hendricks.

Mitchell Bros. Plumbing Co., Springfield, O. Capital stock, $25,000. Incorporators: W. M. Mitchell, Ralph O. Kramer, Warren S. Piper, William H. Swanton, Edward T. Smith and Frank Welchaus.

Reliance Heating & Engineering Co., St. Louis, Mo. Capital stock, $4,000.

Lawrence Plumbing Co., Spokane, Wash. Capital stock, $100,000.

Roberts Heating & Ventilating Co., Minneapolis, Minn., reorganized and incorporated with a capital stock of $75,000, to conduct a jobbing business in furnaces, boilers and heating supplies. President, E. H. Roberts; secretary, L. L. Hamilton, formerly with the B. F. Sturtevant Co., Boston.

National Ventilating Co., Portland, Me., capital, $10,000; "to acquire patent rights and business pertaining to heating and ventilating." President, Clarence L. Eaton.

American Ventilating Co., Portland, Me., capital, $500,000; "for the purpose of manufacturing, selling and operating ventilating and heating devices of every kind." Treasurer, T. L. Croteau. J. H. Cogan & Co.

Cobb Boiler & Mfg. Co., New York, capital, $50,000; to manufacture boilers, hot water heating apparatus and plumbing specialties. Incorporators: H. M. Browne, F. W. Mills, E. J. Forhan, all of New York.

Fishback Plumbing & Supply Co., Bartlesville, Okla. Capital stock, $20,000.

Mitchell Plumbing Co., Springfield, O. Capital stock, $10,000.

Charm Air Regulator Co., Brooklyn, N. Y. Capital stock, $10,000. Incorporators: Edmund N. Florant, New York, and H. H. Garrison, Brooklyn.

New Firms and Business Changes

Nygren, Tenney & Ohmes, 907-916 Fulton Building, Fulton and Nassau streets, New York, has been organized to continue the consulting heating and ventilat-

"CROOKED WORK MADE EASY"

Slotted Angle Flanges will make any angle up to and including ten degrees. Any angle up to the maximum can be made simply by shifting the two flanges to the desired position. The slot in the bolt circle gives bolt hole for any position, and after adjusting to the desired angle fitting is made up in usual manner.

Method of Making Angle with Slotted Angle Flange.

AMERICAN DISTRICT STEAM CO.

Lockport, N. Y. N. Tonawanda, N. Y. Chicago

CLASS A RETURN TRAP

—ESTABLISHED 1870—

The Albany Steam Trap Co.

ALBANY, N. Y.

Manufacturers of

RETURN STEAM TRAPS, NON-RETURN STEAM TRAPS, PUMPS, PUMP GOVERNORS. ALSO HIGH GRADE STEAM VALVES

Our 37 years' experience in this line is worthy of your attention

JAMES H. BLESSING, President

THOMAS F. RYAN, Sec. and Treas.

ing engineering business of the late Alfred R. Wolff. The firm is made up of Werner Nygren, Theodore S. Tenney and Arthur K. Ohmes, all of whom were long associated with Mr. Wolff.

Burke & Gross Heating & Plumbing Co., Rock Island, Ill., is a new firm which has opened for business at 2200 South avenue.

Columbus Heating & Ventilating Co., Columbus, O., has taken steps to increase its capital stock to $200,000. The company will build a foundry and enameling plant for the manufacture of its ventilating devices.

Contracts Awarded

J. H. Cogan & Co., Augusta, Me., heating, ventilating and plumbing new Corry high school, for $10,000.

Barnd & Geiger, Buffalo, N. Y., hot water heating Felician Sisters' convent, Buffalo, for $23,000.

Frank H. Falls, Rochester, N. Y., steam heating plant in Rochester Box & Lumber Co.; 10,000 sq. ft. of radiation will be installed.

Robert Dalzell, Jr., Co., San Francisco, Cal., heating and ventilating Bryant Cosmopolitan school, for $14,827.

John R. Donnelly, Austin, Texas, steam heating Austin high school building, for $4,000.

E. M. Chadbourne, San Francisco, Cal., heating, ventilating and sprinkler systems for new Columbia Theatre in that city, for $6,050.

Iron City Heating Co., Pittsburg, Pa., steam heating and ventilating new Y. M. C. A. building in that city. The plant will include a central power plant in the building and 10,000 sq. ft. of radiation will be used.

Business Troubles

Baltimore Refrigerating & Heating Co., Baltimore, Md., with an authorized capital stock of $2,000,000, has been placed in the hands of a receiver. About 300 plants in Baltimore are furnished with heat by this company.

O'Neill Heating & Plumbing Co., Quincy, Ill., is financially embarrassed, owing to the defalcation of one of its employees. The affairs of the company will be conducted for the present by a trustee.

American Diesel Engine Co., 11 Broadway, New York, manufacturer of oil and gas engines, has failed with assets amounting to $100,000 and liabilities of $200,000. The company was organized in 1901 with a capital stock of $250,000.

Staples Valve Co., Newburgh, N. Y., manufacturer of plumbing goods, has been placed in the hands of a receiver.

THE McCREERY SYSTEM
OF . HANDLING . VENTILATION . AIR

Removes not only dust but soot, smoke and odors.
Humidifies the hot air of an indirect heating plant.
Cools the air in summer by either natural or artificial means.

AIR WASHERS bearing the McCreery name plate use an effective water spray in a permanently serviceable way.

Each equipment is designed to meet the requirements of the installation whether for cleansing, depositing, tempering, cooling, drying or moistening.

Five Patents Allowed

McCREERY ENGINEERING COMPANY
TOLEDO, OHIO

Wanted

A well educated young man, about 21, who is familiar with and has had some experience estimating and making plans for steam and hot water heating. One who can do typewriting preferred. Fine opportunity for advancement. Address, giving full particulars and references, MANUFACTURER, care of THE HEATING AND VENTILATING MAGAZINE.

Mechanical Engineer, 15 years practical experience, steam power plants, steam and hot water heating and ventilating, designing, estimating and managing construction, desires a responsible position with contractor, builder or architect doing work in this line. Would consider taking working interest in business proposition with the right parties in or near New York. Address Mechanical, care HEATING AND VENTILATING MAGAZINE.

Erecting superintendent for power plants, steam and hot water heating and ventilating, desires position; 25 years experience. Can give best references. Address Superintendent, care HEATING AND VENTILATING MAGAZINE.

Radiators (steam and water). Quotations are requested by Mr. J. Hommel, 41 Front street, Schenectady, N. Y., for above apparatus, to be shipped to Europe. First order amounting to about $20.000.00. Quotations should give full description and weight.

No More Cracked or Split Seats and Tanks

There's no longer any need of using seats and tanks which will go to pieces in a short time. J-M SANITOR SEATS AND TANKS will last almost as long as the building in which they are installed. Many articles made of the same material used in these Seats and Tanks, are about as good as new today, after over thirty years' of service.

J-M SANITOR

(One-Piece)

Seats and Tanks are moulded in one piece, therefore have no joints to become unglued. Moisture, heat or urine cannot affect this material. It is warranted not to crack or split. Is hard and smooth.

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Furnished complete with all fittings, in Mahogany, Oak or White Enamel. Only an expert can detect them from wood.

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THE J. L. Mott Iron Works

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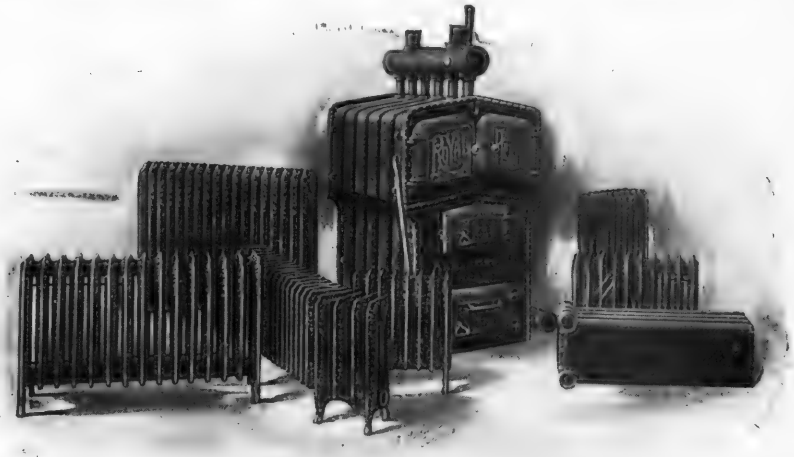

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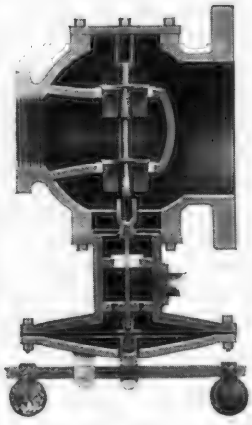

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Diaphragm Type

Made in both globe and expanded Outlet patterns

This valve is designed especially for use on vacuum or low pressure heating systems to automatically reduce any high initial pressure down to the required low pressure, which is maintained on the system.

It has a diaphragm of large area and the stem which connects it to the inner valve does not pass through a stuffing box. On account of this construction the regulator is very sensitive and will respond instantly to any variation in the demand for steam.

The governing pressure is taken at some distance from the valve where an average pressure is maintained and brought to bear upon the diaphragm through a small pipe which screws into the diaphragm chamber, thus insuring a constant operating pressure.

Our complete catalog of valve specialties for POWER PLANTS and HEATING SYSTEMS will be sent upon request.

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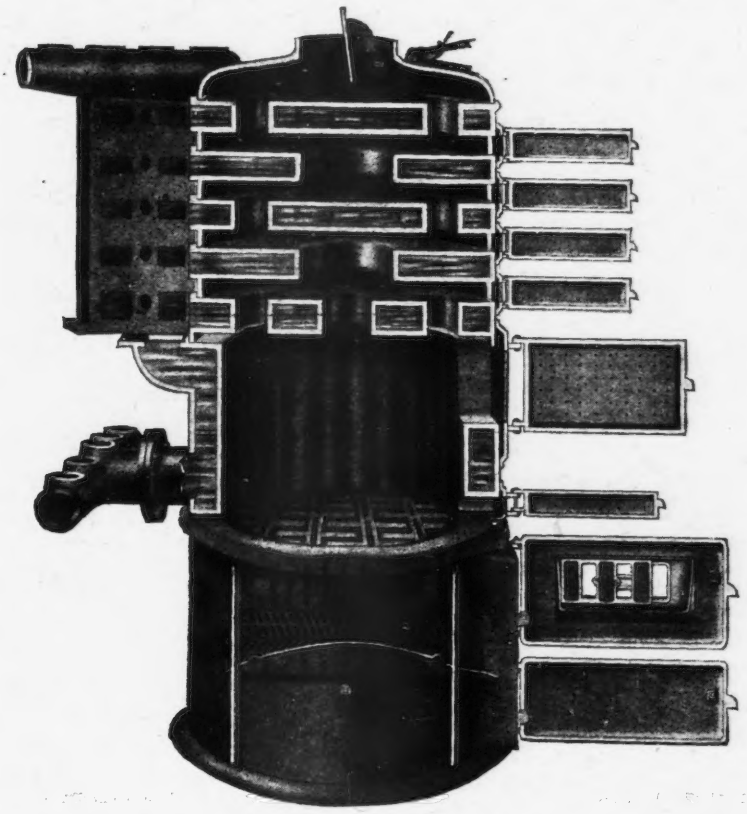
is a most unique and most successful Hot Water Boiler. It is made in four styles, A, B, C and D, in 51 sizes with capacities from 350 to 2750 square feet direct radiation.



All four styles have the detachable water post which is an exclusive feature found only on the "SPENCE."

The style "D" has a special high base with a sifting grate that will sift the ashes inside the heater without dust or dirt escaping and will furnish a good fuel for banking the fire.

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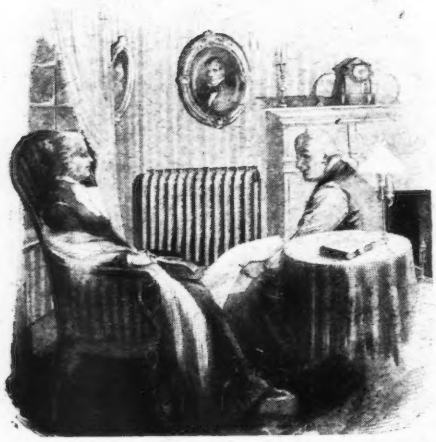

IDEAL-AMERICAN outfits are known in cottages, and mansions, and every class of residence or building, large and small.

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